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ABSTRACT

This comprehensive field test report describes a 1978 impact evaluation of the 3-program "Collecting Information" cluster of ThinkAbout, a series of 60 15-minute instructional television programs for fifth and sixth graders designed to strengthen reasoning skills and review and reinforce language arts, mathematics, and study skills. The ThinkAbout Project and the specific Collecting Information cluster (one of 13 in the series) are explained, as well as the design and implementation of the field test, which assessed the classroom process, student outcomes, and teacher reactions. On the basis of data gathered through observations, questionnaires, story problems, and interviews, it was concluded that classroom use of the cluster met the project expectations. Appendices contain the teachers' guide materials and data collection instruments used in the field test, cognitive structure and multidimensional scaling techniques, agenda for observer training sessions, analysis of variance tables for student questionnaires, and teachers' comments on the cluster. (LHM)

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THINKABOUT CLUSTER EVALUATION:
COLLECTING INFORMATION

Agency for Instructional
Television
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April, 1979

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ACKNOWLEDGMENTS

Field studies of this magnitude are never the solitary effort of a person or even an agency. There are many people and organizations whose activities on behalf of this research study must be acknowledged.

The design, conduct, analysis and reporting of this field test were the responsibilities of Fay Carrozza and Brenda Jochums. They worked with members of the *ThinkAbout* project staff and Executive Committee to develop the design and instrumentation. Also working on this aspect of the field test was Tom Schwen of Indiana University, and LeGrand Fairbourn, an AIT intern from Brigham Young University. Assisting in the analysis and interpretation of the data were James Flagg, Wayne Wolfe, Bob Sloan and Tom Schwen, all of Indiana University.

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This field test is for those working and studying at these schools and at schools in states and provinces who will be using *ThinkAbout* in the coming years.

Saul Rockman
 Director of Research

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CHAPTER I

THINKABOUT PROJECT AND THE COLLECTING INFORMATION CLUSTER

ThinkAbout is a series of sixty 15-minute programs in the Skills Essential to Learning Television Project. The series is being developed by the Agency for Instructional Television in conjunction with a consortium of 35 state and provincial education agencies with additional support from the Corporation for Public Broadcasting and the Exxon Corporation. *ThinkAbout* will be ready for initial use in the 1979-80 school year.

Aimed at 5th and 6th graders, the series is designed to strengthen reasoning skills and review and reinforce language arts, mathematics, and study skills. *ThinkAbout's* four major goals are to encourage and improve confident and flexible thinking, self-management, effective expression, and systematic reasoning.

ThinkAbout is divided into "clusters," or groups of programs. Clusters present general thinking skills -- classifying, giving and getting meaning, sequencing, using criteria among them -- skills that can be used when solving problems in school and out.

Interspersed between clusters are two other kinds of programs -- tips and challenges. Tips offer ideas to aid problem solving. Challenges are complex, thought-provoking problems intended to stimulate students' intellectual adrenalin. Each challenge provides an indication of how students

are progressing toward the goal of independent learning. Overall, *ThinkAbout*'s sixty programs offer students opportunities to improve their reasoning, study, mathematics, and language arts skills and apply them repeatedly.

In the plan for *ThinkAbout*, the cluster was proposed as the minimal unit for studying the impact of the series. The first cluster evaluations would be conducted in the spring, 1979, after several clusters had been completed. However, in response to the *ThinkAbout* consortium's need for earlier information relating to series impact, in November and December, 1978, the evaluation staff undertook the field test reported here.

In planning this study, evaluators worked closely with the *ThinkAbout* Executive Committee to define the focus and methodological approach of the evaluation. An important issue in these early discussions was the differing expectations for the information this study might provide. To develop a workable plan, the information needs expressed by the consortium were simplified. Those needs were translated into the question, "Is the series working?" which suggests a summative-type evaluation. However, because a summative study assumes a finished product, this kind of question was thought inappropriate. Clearly a more feasible approach was to look at the impact of a cluster of programs on teachers and students. Impact would be defined as the degree to which the cluster met its objectives. The Collecting Information cluster was chosen for the evaluation because it was the first complete cluster available for extended study.

To plan the study, a precise definition of the cluster's objectives was required. The Executive Committee determined that the cluster objectives specified in Design Report #6 would be used to assess impact on students. In addition, a set of expected outcomes to measure impact on teachers would

be measured on a lesson-by-lesson basis. The cluster outcomes were defined on two levels — Essential Outcomes and Desirable Outcomes. (See Figure I.1.)

For the cluster to be considered successful, both teachers and students would have to meet its essential outcomes. In addition, the cluster evaluation would examine desirable student learning outcomes and integration of the cluster with the ongoing curriculum.

The field test was designed, then, to look at the impact of the cluster on teachers and students with respect to the cluster outcomes set down by the Executive Committee. In addition, the field test design included a consideration of several other issues which it was felt might have a bearing on the likely impact of the cluster. Specifically, these issues were: (1) the extent to which teachers perceived a variety of lessons that might be taught in conjunction with each program in the cluster; and (2) the extent to which there was a carry-over of the concepts of the programs into other lessons throughout the school day.

The design and implementation of the field test were based on several key assumptions. Paramount was the assumption that the context in which the cluster was evaluated would be representative of conditions of actual series use.

To construct such an approximation of actual use, very specific criteria for the sample of participating classes were developed (see Chapter II), and two conditions of teacher preparation were included in the field test design. Thus, the context for which this field test was designed consisted of:

1. self-contained classes that were heterogeneously grouped for ability;
2. a sample with one-quarter minority group students;
3. classes to be regular TV users;

4. some of the teachers using the series to be knowledgeable about the *ThinkAbout* series and about the cluster, while others to be limited in the information they received;
5. no opportunity to preview the cluster programs would be available to teachers; and
6. by the time the Collecting Information cluster was shown the classes would have watched previous *ThinkAbout* programs.

I. Essential Cluster Outcomes

A. After each program:

After each program in the Cluster, without benefit of a Teacher's Guide or specific encouragement, teachers will conduct at least a 13-minute discussion related to at least one of the following items:

1. Program 1:

- | | | |
|-------------------------------|----|---|
| Reasoning/
Problem Solving | { | a. determining information needs when solving a problem, pursuing an interest, etc. |
| | | b. planning for an information collection activity (the value of or techniques for) |
| Related Skill | c. | using standard reference aids: classified ads |

2. Program 2:

- | | | |
|-------------------------------|----|---|
| Reasoning/
Problem Solving | a. | the value of and techniques for planning an information collection activity in terms of types of sources, locating sources, selecting an appropriate source |
| Related Skills | { | b. locating print reference materials in a library or media center |
| | | c. using standard reference aids: encyclopedia |

3. Program 3:

- | | | |
|-------------------------------|----|---|
| Reasoning/
Problem Solving | a. | ways to gather information |
| Related Skills | { | b. collecting information to answer specific questions by conducting a survey |
| | | c. interviewing resource persons to gain specific information |
| | | d. reading and making a bar graph |
| | | e. finding the arithmetic average |

B. After the Cluster:

After the entire Cluster, students will demonstrate the achievement of the following:

1. Greater awareness that planning is more useful than not planning.
2. Greater awareness of consequences of not being planful. Students will be better able to predict consequences of not planning.
3. In simulated data collection problems, greater abilities to describe a wider range of sources and techniques for collecting information (the range of alternatives will increase).

Figure I.1 Cluster outcomes.

BEST COPY AVAILABLE

BEST COPY AVAILABLE

II. Desirable Cluster OutcomesA. After each program:

After each program in the Cluster, teachers will provide activities wherein students:

1. Program 1:

- | | |
|-------------------------------|--|
| Reasoning/
Problem Solving | a. determine information needs in a systematic way. |
| Related Skill | b. use the parts of a newspaper, including the index and the classified ad section |

2. Program 2:

- | | |
|-------------------------------|---|
| Reasoning/
Problem Solving | a. <u>identify, locate, select</u> and use sources appropriate for his/her purpose |
| Related Skill | b. apply one or more of the related skills (listed under Essential Outcomes above for Program 2) in a problem-solving context |

3. Program 3:

- | | |
|-------------------------------|---|
| Reasoning/
Problem-Solving | a. use various information gathering techniques (interviews, questionnaires, secondary source data bases, etc.) |
| Related Skill | b. apply one or more of the related skills (listed under Essential Outcomes for Program 3) in a problem-solving context |

B. After the Cluster:

After the entire cluster, students will engage in a performance activity to demonstrate being better able to determine systematically information needs related to the clarification or solution of a problem, selecting appropriate sources of this information, and collecting relevant pieces of information.

Criteria for the performance activity being met include:

1. More systematic process (list needs, sources, techniques, etc.)
2. Richer set of sources considered.
3. Wider variety of techniques for collection considered.
4. Selected sources and techniques justified more fully by students.
5. Valuing of systematic approach.

Figure I.1 Cluster outcomes, continued

CHAPTER II

FIELD TEST DESIGN

Sample

The Collecting Information cluster was field tested in 60 classrooms from November 29 through December 12, 1978. Participants were twenty 5th and 6th grade classes in each of three communities -- Kansas City, Missouri; Syracuse, New York; and Knoxville, Tennessee.

The field test was designed for a minimum of 54 classes with equal numbers of 5th and 6th grades. To allow for some attrition over the course of the evaluation period, 60 classes were requested to participate. All 60 classes did complete the field test activities.

To obtain a sample of classes considered to be reasonably representative of potential *ThinkAbout* users, the following criteria were specified for participation:

1. all classes will be regular TV users (each class should use at least one TV series 75% of the time);
2. all classes will be "typical" in ability and heterogeneously grouped;
3. all classes will be self-contained;
4. within each condition, minority students will comprise at least 25% of the sample;

5. within each condition, one-half of the classes will be 5th grade and one-half of the classes will be 6th grade.

In addition, each school needed to have a 3/4" VTR available during the field test.

Each participating teacher completed a Classroom Status Form which provided demographic information. An analysis of that information indicated that:

1. Of the 60 classes 32% were "regular TV users" (using instructional television once a week or more).
2. Of the 60 classes 85% were rated either "average" in ability (on a 3-point scale from "below average" to "above average") or heterogeneously grouped.
3. Minority group students comprised 29% of the sample.
4. Half of the sample classes were 5th grade and half were 6th grade.

Class Departmentalization

To lessen the complexity of the evaluation and to increase the ease of assessing classroom process, the criteria for class participation specified self-contained classrooms only. When the field test got underway, however, a majority of the classes (55%) obtained for this study turned out to be departmentalized. The type of departmentalization varied from school to school — from ability-grouped reading classes only to full departmentalization of every subject.

For purposes of some data analyses, the classes were divided into these two groups. (1) Self-contained is defined here as those classes in which the students and teacher stay together for every academic subject throughout the day. (2) Departmentalized classes are considered those in which the students and/or teacher change for at least one academic subject.

Field Test Conditions

The Collecting Information cluster was examined under three different conditions of teacher orientation to the *ThinkAbout* series. In the complete orientation condition, the teachers participated in a one-hour workshop, orienting them to the *ThinkAbout* series and to the cluster. These workshops tried out a format for a one-hour teachers' orientation workshop prepared by the AIT Communications Department. During the workshop teachers received complete Teacher's Guide materials for the cluster. (See Appendix A.)

In the minimal orientation condition, participating teachers were given only a brief overview of *ThinkAbout* and only the information about the cluster necessary for participation in the field test. They received a one-page summary of the three cluster programs. (See Appendix A.)

In the control condition, teachers attended the same workshop as the minimal orientation participants. Since their classes would watch programs from *bread & butterflies* instead of the Collecting Information cluster, these teachers received the *bread & butterflies* Teacher's Guide.

The two different conditions for the *ThinkAbout* teachers were designed to test the relative effects of teacher preparation for the cluster both on the kinds of lessons taught in conjunction with the programs and on student learning. The control condition was designed to provide comparative data for student learning outcomes. Although the control group classes viewed a different series they received observation and measurement treatment identical to that given the *ThinkAbout* classes.

In assigning classes to the three conditions, at least one control class was assigned to nearly every school that participated. In addition, in any one school, teachers were assigned either to the complete orientation or the minimal orientation condition, but not both. This was done so that

complete orientation teachers would not provide information about the cluster to minimal orientation teachers.

To illustrate the proposed field test design the Tables to follow in this section show the distribution of classes among conditions on the basis of 54 classes completing the field test. The eventual distribution of the 60 participating classes will be illustrated in Chapter III.

Table II.1
Distribution of Classes By
Field Test Condition

Teacher Preparation	No. of Classes
Complete Orientation	18
Minimal Orientation	18
Control	18
TOTAL	54

Student Outcomes

Student outcome measures were administered at three times during the field test — prior to the first cluster program, immediately following the last program, and an interview a day or two after the cluster was complete. These measures were related to the essential outcomes specified in the cluster outcome statement.

1. Pretest. Written pretests were given to one-third of the classes in both experimental and control conditions before the cluster programs were shown.

Table II.2
Number of Classes Taking Pretest
By Field Test Condition

Teacher Preparation	Measures Given to Students		
	Pretest		
Complete Orientation	6	-	-
Minimal Orientation	6	-	-
Control	6	-	-
TOTAL	18	-	-

2. Posttest. Written posttests were administered after the cluster was completed. Classes which took the pretest received the same test forms in the posttest. In addition, another one-third of the classes took the posttest to control for a training effect of the pretest.

Table II.3
Number of Classes Taking Posttest
By Field Test Condition

Teacher Preparation	Measures Given to Students		
	Pretest Posttest	Posttest	
Complete Orientation	6	6	-
Minimal Orientation	6	6	-
Control	6	6	-
TOTAL	18	18	-

3. Interview. On the school day after the cluster was completed an interview was administered to several students in each class. Again, an additional one-third of the classes in each teacher orientation condition participated in the interview to control for possible training effects of previous testing.

Table II.4
Distribution of Classes
By Field Test Condition

Teacher Preparation	Measures Given to Students			TOTAL
	Pretest Posttest Interview	Posttest Interview	Interview	
Complete Orientation	6	6	6	18
Minimal Orientation	6	6	6	18
Control	6	6	6	18
TOTAL	18	18	18	54

Types of Data Collected

To perform the data collection, substitute teachers in each school district were hired as classroom observers. Typically, each pair of observers was responsible for the data collection in four classrooms. Data were collected to explore three different areas of cluster impact — classroom process (using observation systems), student outcomes (using written questionnaires and interviews), and teacher reactions (using written questionnaires). All of the forms used to collect data can be found in Appendix B.

Classroom Observation

A central element of the field test was observation of classroom interaction relating to the cluster programs and to the concepts of collecting information. Classroom observations occurred both when the programs were shown and at other specified times throughout the field test period.

1. Observations When the Programs Were Shown -- Each time a program was shown, observers working in pairs were present in the classroom.
 - a. Narrative Form. One observer recorded a narrative account of the pre-viewing and post-viewing lessons presented by the teacher. In addition, teacher and student behaviors during the program were documented.
 - b. Summary Form. The second observer documented the follow-up lesson on a structured summary observation form. This form contained criteria for lessons related to both the essential and desirable teacher outcomes. The observer reported the nature of the lesson as it touched upon those criteria.
2. Observations When the Programs Were Not Shown -- At specified times when the programs were not shown, observers working alone documented lessons taught during the regular school day. The purpose of these observations was twofold: to determine the extent to which the *ThinkAbout* programs were mentioned in the context of other lessons, and to determine the extent of instruction relating to collecting information in the context of other lessons. Observations conducted when the programs were not shown were labeled "context" observations to distinguish them from the summary and the narrative. (See Appendix B for Context Form.)

Prior to the field test these context observations were scheduled in each class for either one or two 40-minute periods during each day of the two-week evaluation. Teachers were informed that the observer would visit each class at times when the programs were not shown, but they were to be unaware of the time and of the specific nature of those visits.

Student Outcome Measures

Four types of measures were administered to students during the evaluation. All written tests were administered by the students' regular teachers, while the interviews were conducted by the classroom observers. Students completed only one version of the written measures as a pre- and posttest. Observers were responsible for making sure that the teachers administered the tests at the appropriate time.

1. Student Questionnaires — Two multiple-choice questionnaires were administered both as a pretest and as a posttest. These alternate forms were designed to assess awareness of the utility of planning, awareness of the consequences of not planning, and the ability to describe a wide range of sources and techniques for collecting information.
2. Cognitive Structure Questionnaires — Two questionnaires designed to map students' cognitive structure with respect to collecting information were administered as both a pretest and as a posttest. Students were asked to rate the similarity of steps in the process of collecting information or the similarity of techniques for collecting information. (See Appendix C for discussion of cognitive structure and multidimensional scaling.)

3. Story Problems — Two open-ended questionnaires were administered both as a pretest and as a posttest. In each form a problem situation was presented and students were asked to determine the information needs and to describe appropriate sources and techniques for collecting information relevant to the problem.
4. Interviews — Because it was felt that richer and more complete responses could be elicited orally than in writing, three different interview forms were used to parallel the story problems. Two of the problems were identical to the story problems while a third was unique to the interviews. For the interview, the student was presented with a situation for which she would need to collect information. The student described her strategy to the observer who recorded the responses on the interview form. Students who had previously been exposed to the story problems as a written test were not given those situations in the interviews.

Teacher Questionnaires

Each teacher who used the *ThinkAbout* programs completed four teacher questionnaires. After each program in the Collecting Information cluster teachers indicated the range of lessons they perceived might have been taught in conjunction with the program. In addition, they rated the degree to which each of the program's objectives were effectively addressed. After the entire cluster, teachers responded to a set of questions dealing with the cluster as a whole. (See Appendix 3.)

Time Line for the Field Test

Figure II.1 shows the sequence of events during the field test. The first three days of the field test (November 29 - December 1) were designated the "warm-up" period. During this time all classes — both *ThinkAbout*

N November 27	T 28	W 29	Th 30	F December 1
observer training	observer training teachers' meetings	1st "warm-up" program shown observations	observation	2nd "warm-up" program observations pretest
N 4	T 5	W 6	Th 7	F 8
Program 1 observations	Program 1 observations	Program 2 observations	Program 2 observations	Program 3 posttest observations
N 11	T 12	W 13	Th 14	F 15
Program 3 posttest observations interview	interview observations	make-up	make-up	make-up FIELD COMPLETED

Figure II.1 Field test time schedule

and control — watched two *ThinkAbout* programs that were not a part of the Collecting Information cluster. Those programs were "Many Ways to Go" (dealing with alternate approaches to solve a common problem) and "Brainstorming" (dealing with a technique for generating many alternatives for the solution of a problem). (See Appendix A for the complete and minimal teacher's guide materials used with the "warm-up" programs.) This period allowed for observers and classes to adjust to the field test mechanism. Observers practiced using their instruments while classes became familiar with the observers and, to some unknown degree, with *ThinkAbout*. At the end of the warm-up period pretests were given. Thus both the experimental and control classes had equal familiarity with the warm-up concepts.

Three make-up days were scheduled at the end of the field test. If a classroom teacher were absent when his or her class was scheduled for a program, the field test activities could be delayed until the teacher returned. The make-up time allowed for the field test to be pushed forward a maximum of three days until all activities were completed.

Limitations of the Study

The conditions under which any field test is carried out obviously can affect the results. In this field test design, the conditions described above were specified in an attempt to control the context in which the lessons were used. However, certain other circumstances also prevailed which may have affected the outcomes reported here. To the extent that we can recognize those conditions and consider their influence they are described below.

1. This field test was conducted between Thanksgiving and Christmas, one of the busiest times of the school year. Although the timing was not optimal, it was necessary in order to make adequate

preparations beforehand and to allow time for analyzing the data for reporting the field test results to the *ThinkAbout* consortium in February.

2. Most teachers were given only a few weeks' notice before the field test began. However, some of the teachers had no information about *ThinkAbout* or the field test until one day before the evaluation started. In many cases this lack of prior knowledge prevented teachers from preparing their students as they might during regular series use; it also inhibited their ability to fully integrate the cluster into the on-going curriculum.
3. It is unclear how teachers were recruited to participate in the field test. Most probably the selection process differed across school districts. While participation was voluntary in most cases, it is possible that in some cases teachers were required to participate. Teachers were paid a \$50 honorarium for their time spent out-of-school in preparing for the field test activities.
4. Although the field test was designed for self-contained classes, 33% of the classes which participated were departmentalized. This unexpected situation created a good deal of confusion in two sites at the beginning of the field test. Observations had to be rescheduled and in some cases a good deal of maneuvering had to be done to fit in all the field test activities. According to observers' reports, however, this state of confusion was resolved by the end of the warm-up period.
5. Despite efforts to develop functional class schedules for showing programs and conducting observations, in many cases the initial schedules were inaccurate. In the process of rescheduling once the field test was under way some teachers became aware of when

the observer would arrive for the context observations described above. In this process also some teachers became aware of the purposes of those observations. It had been hoped that teachers would be naive to that information to insure that lessons would not be biased as a result of the observers' presence.

6. Despite our sample criteria which specified that classes should be regular TV users, only one-third of the classes actually met that criterion.
7. While 5th and 6th grade classes each comprised one-half of the sample, classes were not always balanced by grade within each field test condition. (See Chapter III.) This was due to the logistics of assigning classes to conditions and to a mix-up in one site regarding distribution of 5th and 6th grade classes.
8. While non-white students comprised 29% of the sample, not all of the field test conditions achieved at least one-fourth minority representation. The proportion of minority students in each condition ranged from 16% to 35%.
9. During the warm-up period both *ThinkAbout* and control groups saw two *ThinkAbout* programs. The purpose was to equalize the orientation of the two groups in order to isolate the impact of the Collecting Information cluster. Inadvertently, however, those programs may have sensitized the control group to problem-solving strategies. Therefore, both the control group and the *ThinkAbout* students may have a "heightened" baseline score as a result of the warm-up programs.

Some of the limitations described above may have influenced certain outcomes of this field test; others are likely to produce "random noise"

in the data and can be ignored. Whenever possible, the influence of a field test limitation will be noted in the discussion of the results.

The results reported in this document describe what happened in classrooms as they used the Collecting Information cluster. These results should be considered tentative indicators of how the cluster might be used in other situations and under other conditions. The field test results should not necessarily be generalized to the *ThinkAbout* series as a whole, nor to the population of *ThinkAbout* users.

CHAPTER III

IMPLEMENTATION OF THE COLLECTING INFORMATION CLUSTER FIELD TEST

Observer Training

Before the field test began in classrooms, observers attended a two-day training workshop. (See Appendix D.) At these sessions, observers learned about the SEL Project, *ThinkAbout*, and the purposes of the field test. All of the cluster and "warm-up" programs were viewed and discussed. Using several videotaped lessons, observers practiced using the observation instruments. Student questionnaires were also reviewed so that observers could assist the teachers in administering those forms. Finally, observers attended the teachers' meetings that occurred the afternoon before the field test began.

Teacher Workshop

All teachers who participated in the field test attended a two-hour workshop. After a brief welcome, teachers were divided into two groups: the complete orientation group and the minimal orientation plus control group. Observers were divided between the groups. The complete orientation group spent the first hour participating in the *ThinkAbout* teacher orientation workshop prepared by AIT's Communications Department. During the second hour, the field test was explained, class viewing schedules were distributed, and questions were answered.

The minimal orientation and control group teachers together spent the first hour watching a warm-up program and discussing it briefly. A short explanation of the SEL Project was also given. During the second hour, class viewing schedules were distributed and questions were answered.

In two sites extensive re-scheduling of viewing and observation times was done during the teachers' workshops. Teachers and observers worked together on this task.

Field Test Conditions

Although the field test was designed for 54 classes, all 60 classes invited to participate actually completed the evaluation. The distribution of classes among conditions is shown in Table III.1.

Table III.1

Actual Distribution of Classes Among Field Test Conditions

Teacher Preparation	Measures Given to Students			TOTAL
	Pretest Posttest Interview	Posttest Interview	Interview	
Complete Orientation	7	7	7	21
Minimal Orientation	6	6	7	19
Control	7	7	6	20
TOTAL	20	20	20	60

The imbalance of classes among the three field test conditions was a result of the logistics of assigning classes to conditions. That imbalance occurred because of the numbers of classes per school and because of the necessity of isolating complete orientation teachers from minimal

orientation teachers. The unequal cells in the field test conditions did not have any effect on the collection or analysis of the data.

In the field test design, equal numbers of 5th and 6th grades were to be balanced within each field test condition. Due to a mix-up in one site, however, that balance was not achieved in every case. The distribution of 5th and 6th grade classes among conditions is shown in Tables III.2 and III.3 respectively. This imbalance had an effect on several analyses of student outcomes which will be noted as they occur.

Table III.2

Actual Distribution of Fifth Grade Classes
Among Field Test Conditions

Teacher Preparation	Measures Given to Students			TOTAL
	Pretest Posttest Interview	Posttest Interview	Interview	
Complete Orientation	3	4	4	11
Minimal Orientation	3	4	4	11
Control	5*	1*	2	8
TOTAL	11	9	10	30

* One class in this condition was a combined 5th and 6th grade.

Table III.3
Actual Distribution of Sixth Grade Classes
Among Field Test Conditions

Teacher Preparation	Measures Given to Students			TOTAL
	Pretest Posttest Interview	Posttest Interview	Interview	
Complete Orientation	4	3	3	10
Minimal Orientation	3	2	3	8
Control	2	6	4	12
TOTAL	9	11	10	30

The field test design specified that the proportion of minority students in each condition be at least 25%. The actual distribution of minority group students is shown in Table III.4.

Table III.4
Percentage* of Minority Group Students
in Each Field Test Condition

Teacher Preparation	Measures Given to Students			TOTAL
	Pretest Posttest Interview	Posttest Interview	Interview	
Complete Orientation	30	23	16	23
Minimal Orientation	31	31	35	33
Control	32	35	26	31
TOTAL	31	30	26	29

* Percentage of total number of students in each condition.

Although the field test design called for self-contained classes, a majority turned out to be departmentalized. Tables III.5 and III.6 illustrate the distribution of classes among field test conditions.

Table III.5
Distribution of Self-Contained Classes
Among Field Test Conditions

Teacher Preparation	Pretest Posttest Interview	Posttest Interview	Interview	TOTAL
Complete Orientation	4	3	3	10
Minimal Orientation	3	2	1	6
Control	4	4	3	11
TOTAL	11	9	7	27

Table III.6
Distribution of Departmentalized Classes
Among Field Test Conditions

Teacher Preparation	Pretest Posttest Interview	Posttest Interview	Interview	TOTAL
Complete Orientation	3	4	4	11
Minimal Orientation	3	4	6	13
Control	3	3	3	9
TOTAL	9	11	13	33

CHAPTER IV

STUDENT OUTCOMES

In the process of developing student measures of the impact of the Collecting Information cluster, the evaluators and the Executive Committee discussed three different conceptual approaches. The first, and most desirable, was an actual performance task relating to collecting information. An observation system would be established to directly explore the students' problem-solving behavior. The second approach was to provide a pencil-and-paper simulation problem relating to collecting information. Students would report the intellectual and behavioral processes they would undertake to solve the problem. The third approach was to provide a fairly concrete problem and have the students respond by applying or selecting sources and techniques of collecting information. Conclusions about the thinking process underlying the problem-solving process would be inferred from student responses.

Because *ThinkAbout* deals more with thinking and problem-solving processes than with factual information, each of the three student data collection approaches are process-oriented. They range from performance to the reporting of thinking processes to the selection of specific information collecting alternatives.

The performance approach, although highly desirable, presented enormous logistical problems. The field testing schedule did not permit the time

necessary to develop valid and reliable performance measures; it became evident that training observers for this task and obtaining the required permissions for out-of-class assessment would be enormously difficult. The lack of control over subjects' different resources for collecting information would make it difficult to attribute results to the *ThinkAbout* treatment. Performance tests were deemed impossible.

Both remaining options, problem simulations and the selection of information collecting alternatives were adopted; specific instruments for assessing student impact were designed to take into account the two approaches.

As discussed in an earlier section, four different types of data collection instruments were developed:

- 1) student questionnaires;
- 2) story problems;
- 3) interviews; and
- 4) cognitive structure questionnaires.

The relationship between each of these instruments and the essential and desirable cluster outcomes will be discussed in the sections below. It is important to note how each instrument is related to the conceptual approaches previously mentioned.

Student questionnaires contain multiple-choice items asking for selection of collecting information alternatives to child-centered problems, sources of information, and techniques for collecting information.

The story problems are open-ended, complex, adult-oriented problems. The questions asked of students are abstract and relate to the reasoning processes underlying collecting information.

Student interviews were designed to parallel the story problems—that is, more adult-oriented problems with questions relating to the abstract thinking processes used for collecting information.

Since communication about abstract thinking processes is difficult, students are most likely to respond orally with richer and more complete answers than they would be able to do in writing.

Cognitive structure questionnaires use multidimensional scaling, a family of statistical techniques, to examine the effect of instruction on the way students mentally organize information. (The concepts of cognitive structure and the technique of multidimensional scaling are elaborated upon in this chapter and in Appendix C.) The instruments used relate to both abstract processes and concrete applications of collecting information.

In reporting the data on student outcomes, the two *ThinkAbout* teacher orientation groups (complete and minimal) have been collapsed into one group, the *ThinkAbout* group. Comparison of the data analyzed for these two groups indicated no significant differences in student response patterns as a function of teacher orientation condition.

Student Questionnaire

Two student questionnaires, labeled A and B, were designed as parallel forms to assess essential student outcomes. (See Appendix B.) Each form consisted of one open-ended and seven multiple-choice items. The open-ended item focused on students' ability "to describe a wide range of sources and techniques for collecting information." (See Figure I.1, essential student outcomes, item 3.) Multiple-choice items 2 and 8 dealt with "awareness that planning is more useful than not planning" (Figure I.1, item 1), while multiple-choice items 3 through 7 explored "awareness of consequences of not being planful" (Figure I.1, item 2).

The open-ended item presented a problem and asked students to list ways to collect relevant information to solve the problem. The multiple-choice questions described several situations and had students choose among planful

and unplanful alternatives to solve the problem. All eight questions referred to child-related problems involving the selection of alternatives when applying the collecting information process.

A composite score was computed for each student by totaling the number of correct answers overall. This score, along with scores for several aspects of the open-ended question, were analyzed with respect to several variables:

- 1) treatment condition (comparing *ThinkAbout* students with control group students);
- 2) testing condition (comparing pre- and posttest);
- 3) grade level of student; and
- 4) departmentalized or self-contained classroom organization.

Two-way analyses of variance were performed for treatment by testing conditions, for treatment by grade level, for testing condition by grade level, treatment by classroom organization, and testing condition by classroom organization. T-tests were used to compare the scores of those students who received the posttest only. Appendix E contains analysis of variance tables for Student Questionnaires, Forms A & B. The discussion below addresses only the statistically significant differences found in those analyses.

Results

Open-ended Problems. The open-ended question for Form A asked students to list ways of collecting information about the history of their city. Responses were coded into 13 categories of acceptable sources of information and four categories of techniques for collecting information. The most common sources of information listed were library research, books, people (other than relatives or teachers, but including experts), encyclopedias, and parents. The four categories of information collecting techniques were interviewing,

questionnaires, taking notes, and making charts and graphs. These categories were developed post hoc from responses on the student questionnaires.

The open-ended question was analyzed in three ways: the number of acceptable sources of information named, the number of techniques named, and the number of inappropriate responses.

It was expected that from pretest to posttest, the number of sources and techniques named would increase while the number of inappropriate responses would diminish. It was also expected that *ThinkAbout* students would name a larger number of sources and techniques and would respond with fewer inappropriate responses than control group students.

A significant main effect for treatment condition was found for the total number of acceptable sources named ($F=4.809$, $p<.05$). T-tests indicated that the difference was an effect of different pretest means between the *ThinkAbout* (TA) and control groups (TA mean = 2.35; control group mean 1.73; $t=1.92$, $p<.1$). The two samples of students differed in their ability to name sources of information about the history of their city at the start. Thus, comparisons between these groups on this question should be minimized and differences within each of them explored. Notwithstanding, from pretest to posttest neither group's score changed significantly. At the posttest the two groups' means were not significantly different.

A significant main effect for testing condition was found for the number of techniques named ($F=11.963$, $p=.001$) and for the number of inappropriate responses ($F=5.054$, $p<.05$).

Although no students on the pretest listed any techniques of collecting information, on the posttest some students did list techniques. The change was greater for the *ThinkAbout* group than for the control group, and the techniques listed were, for the most part, specific to the Collecting Information cluster. Table IV.1 shows the group means for *ThinkAbout* and control students

in each testing condition. T-tests performed on the three comparisons indicated a statistically significant pre- to posttest difference for the *ThinkAbout* students only. Students who viewed *ThinkAbout* were able to list significantly more techniques for collecting information after the program than before. Although the difference between *ThinkAbout* and control group students at the posttest was in the expected direction, that difference was not statistically significant. The posttest-only condition provided almost identical results and suggests that there was no effect from giving students the pretest.

Table IV.1
Number of Techniques Named
(Form A, Question 1)

Group	Pretest			Posttest			Posttest Only			P
	n	$\bar{x}$	sd.	n	$\bar{x}$	sd.	n	$\bar{x}$	sd.	
<i>ThinkAbout</i>	62	0	0	57	.19	.48				.002
Control	22	0	0	23	.09	.29				n.s.
<i>ThinkAbout</i>							36	.21	.59	
Control							21	.09	.30	n.s.

Table IV.2 shows the mean number of inappropriate responses to Question 1 by *ThinkAbout* and control group students. The only statistically significant difference found between comparison groups was in the *ThinkAbout* group from the pretest to the posttest. As expected, these students gave fewer inappropriate responses on the posttest than they did on the pretest. Control group students, however, did not change significantly in the number of inappropriate responses listed. Again, posttest-only similarities point to no effect from pretests.

Table IV.2

Number of Inappropriate Responses
(Form A, Question 1)

Group	Pretest			Posttest			Posttest Only			P
	n	$\bar{x}$	sd.	n	$\bar{x}$	sd.	n	$\bar{x}$	sd.	
ThinkAbout	62	.46	1.28	57	.26	.61				.03
Control	22	.50	.80	23	.35	.57				n.s.
ThinkAbout							56	.32	.63	n.s.
Control							21	.38	.74	

A significant treatment condition by grade level interaction was found for the number of acceptable sources named ($F=4.111$, $p<.05$) and for the number of techniques named ($F=4.560$, $p<.05$). This result may be related to the grade distribution of the sample. The *ThinkAbout* group consisted of about 80% fifth graders and 20% sixth graders, while the control group consisted of about 30% fifth graders and 50% sixth graders.

The second open-ended question (Form B) described a problem in which a girl must choose a gift for her class to buy for the school. Part of the question asked students to name the first thing the girl should do to solve the problem; another part asked the students to list all the ways to collect the information she needs. Responses to the first part were coded into nine categories of acceptable answers and four categories of unacceptable answers. These categories were developed post hoc from responses on questionnaires. The most common acceptable responses were: to think about it, to survey the class, and to study the school to see what it needs. Both the number of acceptable and the number of unacceptable responses were totaled for each

student. Responses to the second part (ways to collect information) were coded into 14 categories of acceptable answers. The most common included: ask parents and others for information, ask a teacher, and shop around.

It was expected that for this question, as for the other open-ended problem, the mean number of acceptable responses would increase and the mean number of unacceptable responses would decrease from pre- to posttest within the *ThinkAbout* group. In addition, more acceptable responses and fewer unacceptable responses would be found for the *ThinkAbout* group in contrast to the control group.

In the analysis of variance for acceptable responses to the first part of the question, significant main effects were found for the treatment condition ($F=4.041$, $p<.05$) and for the testing condition ($F=3.23$, $p<.1$). Table IV.3 shows the mean number of acceptable responses for *ThinkAbout* and control groups by testing condition.

Table IV.3

Acceptable Responses
(Form B, Question 1a)

Group	Pretest			Posttest			Posttest Only			P
	n	$\bar{x}$	sd.	n	$\bar{x}$	sd.	n	$\bar{x}$	sd.	
<i>ThinkAbout</i>	62	.53	.56	56	.79	.65				.03
Control	20	.90	.55	21	.76	.70				n.s.
<i>ThinkAbout</i>							54	.67	.67	n.s.
Control							20	.80	.61	

For the *ThinkAbout* students, posttest scores were significantly greater than pretest scores, while for the control group no statistically significant

difference was found. In addition, although the control group pretest scores were significantly higher than the *ThinkAbout* pretest scores ($t=2.55$, $p=.01$), posttest scores were nearly identical. For this question, the maximum number of answers is 1. Thus the control group was approaching the point where everyone reported an acceptable answer. Before the program, the *ThinkAbout* group was not as able to provide acceptable responses. Following the Collecting Information cluster, they improved significantly and matched the ability demonstrated by the control group.

A significant treatment condition effect was found for the number of unacceptable responses given to the first part of the open-ended question. When this effect was explored, a statistically significant difference ($t=2.76$, $p=.05$) was found in pretest means between the *ThinkAbout* group ($\bar{x}=.53$, $s.d.=.56$) and the control group ($\bar{x}=.10$, $s.d.=.3$). That difference did not remain significant at the posttest. For neither group did mean scores change significantly from pre- to posttest.

Table IV.4 shows the mean number of acceptable responses to the second part of the open-ended question. The *ThinkAbout* group's number of acceptable responses decreased on the posttest from the pretest. This result is hard to account for, particularly since the same group achieved the opposite result for the other part of the same question.

Multiple-Choice Items and Composite Scores. Analysis of each of the multiple-choice items indicated mixed results. Although outcomes were, more often than not, in the predicted direction, the magnitude of change was small, and the differences between treatment and control group scores were also small. On some items this was a result of ceiling effects, i.e., so many selected the right answer on the pretest that posttest scores could not increase by very much.

Table IV.4
Acceptable Responses
(Form B, Question 1b)

Group	Pretest			Posttest			Posttest Only			P
	n	$\bar{x}$	sd	n	$\bar{x}$	sd	n	$\bar{x}$	sd	
<i>ThinkAbout</i>	61	2.33	1.18	55	1.84	1.20				.03
Control	19	2.32	1.25	21	2.67	1.39				n.s.
<i>ThinkAbout</i>							54	2.33	1.27	n.s.
Control							19	2.16	1.12	

Since each of these multiple-choice items deals with some aspect of planfulness and since the item scores suggest a small but desirable change, a composite score was developed to examine the overall magnitude of the pretest-posttest movement.

The composite score for Student Questionnaire Form A was computed by adding the number of acceptable responses to Question 1 and all correct answers for the other items on the form. Table IV.5 shows the mean composite scores for *ThinkAbout* and control groups by testing condition.

Table IV.5
Composite Score
(Student Questionnaire Form A)

Group	Pretest			Posttest			Posttest Only			P
	n	$\bar{x}$	sd	n	$\bar{x}$	sd	n	$\bar{x}$	sd	
<i>ThinkAbout</i>	62	9.35	2.83	57	10.02	2.82				n.s.
Control	22	9.09	2.98	23	8.96	2.60				n.s.
<i>ThinkAbout</i>							56	9.84	2.93	.07
Control							21	11.24	3.22	

Of those who took the posttest only, control group students scored significantly higher on Form A than did *ThinkAbout* students. This result may be a function of the imbalance between fifth and sixth graders in those *ThinkAbout* and control conditions. In the *ThinkAbout* group, 100% of the students were fifth graders, while in the control group about 15% of the students were fifth graders and about 85% were sixth graders.

In the analysis of variance, a significant main effect for grade level was found for the composite score ($F=.051$, $p,<.05$). When that effect was explored, no significant differences were found in the T-tests. In addition, a significant treatment condition by grade level interaction ($F=6.485$, $p=.01$) was found for the composite score. It is likely that these two results may be a function of the imbalance of fifth and sixth graders among the field test conditions.

Thus for Form A, the change in composite scores from pretest to posttest is in the desired direction; however, there is no statistically significant difference. The effect of differences in grade levels is more difficult to isolate since the sampling confounds interpretation of the results.

The composite score for Student Questionnaire Form B was computed by adding the number of acceptable responses to Question 1 and all correct answers for other items on the form. Table IV.6 shows the mean composite scores for *ThinkAbout* and control groups by testing condition. The increase in the *ThinkAbout* group's composite score from pretest to posttest was statistically significant at the .06 level while the control group displayed a slight but non-significant decrease in score. For the posttest-only groups, the *ThinkAbout* students scored higher than did the control group although that difference was not statistically significant.

Table IV.6
Composite Score
(Student Questionnaire, Form B)

Group	Pretest			Posttest			Posttest Only			P
	n	$\bar{x}$	sd	n	$\bar{x}$	sd	n	$\bar{x}$	sd	
<i>ThinkAbout</i>	62	7.02	2.24	56	7.77	2.02				.06
Control	20	7.75	2.15	21	7.57	2.56				n.s.
<i>ThinkAbout</i>							54	7.43	2.20	n.s.
Control							20	7.01	2.16	

For both Forms A & B analyses of variance were performed for treatment condition by class type (either departmentalized or self-contained). Of the 24 comparisons in these analyses, only four significant main effects or interactions were found. All of them were on Form A and included the number of acceptable sources of information named, the number of information collecting techniques named, the number of inappropriate responses, and the composite score. These differences may be due to the proportion of self-contained and departmentalized classes between the *ThinkAbout* and control groups. In the *ThinkAbout* group, one-half of the classes were departmentalized and one-half self-contained; in the control group one-quarter of the classes were departmentalized and three-quarters were self-contained. In summary, on these questionnaires there is little evidence of the influence of class organization. The differences noted may be more a function of sampling than of the organizational mode.

Story Problems

Story problem questionnaires, labeled E and F, were designed as parallel forms to measure essential student outcomes. (See Figure I.1, essential student outcomes, item 3.) Each form consisted of a different broad, adult-oriented problem. In six open-ended questions on each form, students were asked to list the information needs relevant to the problem and to relate how to find out that information. The two problems were somewhat abstract. The questions typically asked for information about the process needed to collect information rather than about sources of information.

Responses to each question were coded into categories developed post hoc from the data. Each question was scored by totaling the number of acceptable responses. A composite score for each questionnaire was computed by totaling the question scores. Analyses of variance and T-tests were performed on the data from these forms.

It was expected that group mean scores would increase from pretest to posttest for the *ThinkAbout* group in contrast to control group students. For the posttest-only students, the *ThinkAbout* group should achieve higher scores than the control group.

Air Pollution Problem. Form E presented the problem of finding out about the causes of air pollution in students' respective cities. Question 1 asked students to list information needs. Questions 2 through 5 each gave students an aspect of the problem they would have to explore and asked them to list ways they would go about finding that information. Question 6 asked students to list the kinds of books that might give information about air pollution. Question 1 was coded into five categories of acceptable answers, Questions 2 through 5 were coded into 15 categories of acceptable answers, and Question 6 was coded into 10 categories of acceptable answers.

Table IV.7 shows the mean number of answers for each question given overall by both *ThinkAbout* and control group students combined on Form E.

Table IV.7
Mean Question and Form Scores for
the Air Pollution Problem

Question	Mean Score	Standard Deviation
1	.49	1.01
2	2.12	1.51
3	.98	.79
4	.40	.80
5	2.70	2.31
6	1.73	1.64
Composite	8.42	4.73

N=191

This table indicates that the number of responses to the questions on Form E varied greatly from question to question and that for each question some of the students were able to provide acceptable answers.

Junk Food Problem. Form F presented the problem of finding out how much junk food was eaten by the student's class in a week and how much sugar was in that food. Question 1 asked students to list information needs. Questions 2 through 4 each gave students an aspect of the problem they would have to explore, and asked them to list ways they would go about finding that information. Question 5 asked students to list the kinds of books that might give information about the problem, and Question 6 asked them to list the kinds of people that might be sources of information. Question 1 was coded into 18 categories of acceptable answers, Questions 2 and 3 were coded into 18 categories of acceptable answers, Questions 4 through 6 were

coded into nine categories of acceptable answers. Table IV.8 shows the mean number of answers given overall by *ThinkAbout* and control students combined on Form F.

Table IV.8
Mean Question and Form Scores for
the Junk Food Problem

Question	Mean Score	Standard Deviation
1	1.39	1.20
2	1.30	1.19
3	1.24	1.10
4	.98	.80
5	1.43	1.11
6	2.05	1.62
Composite	8.40	5.24

N=187

This table indicates that the number of responses to the questions on Form F varied greatly from question to question, and that for each question some of the students were able to provide acceptable answers.

For Forms E and F results of the data analysis were mixed. Most comparisons revealed no statistically significant differences between pre- and posttest scores, nor between *ThinkAbout* and control group scores. The most consistent results found were differences between 5th and 6th graders (the 6th graders scoring significantly higher on many of the items and on the composite scores). However, due to an imbalance of 5th and 6th graders among the field test conditions that completed Forms E and F, a confounding of grade level with treatment condition made interpretation of those results difficult.

As noted above some of the results found were inconsistent. In a few cases pretest scores were higher than posttest scores, or control group scores were higher than *ThinkAbout* group scores. In other cases, those results were reversed.

On the basis of responses to Forms E and F, it is clear that 5th and 6th graders possess a very limited ability to communicate on such an abstract level, particularly in writing. The questions required students to decode the instructions, to think hypothetically about subjects that they may not consider in their everyday lives, and then to communicate their thoughts. The intent of asking students questions about air pollution and junk food was to present problems about which students have some base of knowledge, but not so much that a ceiling effect would be found on the questionnaires. Ideally, the problems would challenge students to think and to report about their thinking process. In practice, however, it seems likely that the questions required more effort than the students were willing to spend, a greater ability to communicate than they possessed, and a higher capacity for abstract thinking. Rather than challenge students with an interesting problem, these questionnaires may have frustrated them with an irrelevant one.

Whatever the problems with these forms, clearly they were not sensitive to the Collecting Information cluster in a way that we could observe.

Interviews

Three different interview forms were used as extensions of the story problem questionnaires. Two of the interviews were identical to the story problems administered as written tests. The third interview was a unique situation, more child-centered and concrete in content. Students who had

completed the story problems in written form were not given those situations in the interview.

Air Pollution and Junk Food Interviews. These two problems were discussed in the previous section. Classroom observers interviewed individual students by asking them to respond orally to the questions. The interviewer recorded those answers on the interview forms. Questions were coded, scored, and analyzed identically to those of the written questionnaires.

Results of the data analysis indicated no statistically significant differences for any of the comparisons. Unlike the written story problems, grade level differences were not observed in the interviews. This suggests that the differences observed in the written questionnaires were a function of sixth graders being more proficient at writing. That hypothesis is further supported by the fact that overall mean scores for the interviews were nearly twice those on the written forms for both problems. Tables IV.9 and IV.10 show the mean scores for the air pollution and junk food interviews.

Table IV.9

Mean Question and Problem Scores
for Air Pollution Interview

Question	Mean Score	Standard Deviation
1	.85	1.19
2	3.04	1.44
3	2.17	1.39
4	2.02	1.36
5	2.13	1.05
6	3.61	1.65
Composite	13.82	4.92

N=46

Table IV.10
Mean Question and Problem Scores
for Junk Food Interview

Question	Mean Score	Standard Deviation
1	1.91	1.19
2	2.62	1.66
3	2.27	1.03
4	1.79	.82
5	3.17	1.29
6	3.92	1.41
Composite	15.69	4.99

N=46

Field Trip Interview. The field trip interview was unlike the interviews discussed above. Interviewers asked students to describe what things they would need to think about to plan a class field trip (determine information needs). After the student responded with a list, the interviewer went through that list and asked the child to describe how she would collect the information that was needed (variety of sources and techniques considered). When that task was completed the interviewer gave the student another opportunity to list any more information needs she could think of. The interviewer compared the student's responses to a criterion list of ten information needs. For all those the child did not mention, the interviewer asked what the consequences might be of not considering those items in planning the field trip.

In scoring these interviews, three measures were taken for each student: the total number of acceptable information needs offered, the total number of inappropriate responses, and the number of criterion items mentioned. Data regarding the sources and techniques for collecting the needed information and regarding the consequences of not considering certain items were not

scored, as preliminary coding of the data indicated that a large number of students had misunderstood the task and interviewers had not probed for the appropriate responses.

The data were analyzed as for the other student questionnaires. No statistically significant differences were found for any of the comparisons. Table IV.11 shows the mean number of responses scored for the field trip interview.

Table IV.11
Mean Scores for the Field Trip Interview

Item	Mean Score	Standard Deviation
Total number of acceptable information needs listed	5.82	2.07
Total number of inappropriate information needs listed	.47	.87
Total number of criterion items listed	4.83	2.14

N=78

From inspecting the responses recorded on the interview protocols, it appeared that this question may have been too easy. Students seemed generally familiar with this situation and the considerations one must take into account when planning a field trip. Although this situation was more child-centered than either the air pollution or the junk food problem, it did not seem to challenge students. Like the other interviews, this problem was not sensitive to the Collecting Information cluster in a way that we could observe.

Summary and Conclusions

A review of the data from student questionnaires, story problems, and interviews suggests the following conclusions about the impact of the Collecting Information cluster on students.

1. Fifth and sixth graders are already familiar with conventional sources of information. They can cite a variety of information sources, such as the library, different kinds of people, television, radio, newspapers, and direct observation. Using the Collecting Information cluster does not provide many new sources to add to existing repertoires.
2. Fifth and sixth graders are not as familiar with techniques of collecting information, such as interviewing, questionnaires, and taking notes. The cluster's impact was observed in the greater ability of students to list a variety of those techniques as useful ways to collect information. The data point to a direct relationship between the techniques specifically illustrated in the cluster and the increased knowledge of them.
3. Fifth and sixth grade students are already aware of the value of planning. Given some familiar situation they are able to project the consequences of not planning.
4. After the Collecting Information cluster, fifth and sixth graders were more likely to identify thinking and planning activities as the first thing one should do before beginning a collecting information task.
5. Fifth and sixth graders generally are not able to communicate well about collecting information as an abstract process. When asked to reflect on the process with respect to a relatively unfamiliar, hypothetical task, their ability to communicate either orally or in writing was very limited.
6. Different amounts of teacher preparation and different classroom organization patterns do not seem to be related to student performance. The classes of teachers who had a full orientation to the project and cluster

were not consistently better or worse than those classes whose teachers had only a minimal orientation. The same lack of differential impact was noted for self-contained and departmentalized classrooms.

7. Grade level differences had only a limited relationship with student performance on the story problems. The influence is related to greater communications ability for sixth grade students.
8. Some improvement for *ThinkAbout* students was seen from the pre- to post-tests while inconsistent differences between *ThinkAbout* and control group students were found. These results may have been influenced by the "warm-up" programs. Both the *ThinkAbout* and control groups were well prepared on the concrete items, and both were able to deal with the abstract problems to a limited extent. The effects of the warm-up programs, which illustrate problem-solving, several information collecting activities and techniques, and reasoning skills, may have started everyone off at a fairly high level.

Student Cognitive Structure*

Concern about the ways students mentally organize new information or integrate new information with knowledge they already possess has given rise to a theoretical concept called "cognitive structure." Cognitive structure refers to the internal organization of information and experience. Research in the area touches upon how we learn, organize, store, and retrieve information. Research also examines the reorganization of existing cognitive structures when new information is acquired. Several metaphors have become common in writing about this very abstract idea; terms used include "schema," "schemata," "maps," "ideational scaffolding" as well as "structure."

Even though the word "structure" may connote permanence in some contexts, "cognitive structure" is thought of as a state of affairs which is responsive to both environmental events and the person's own internal or mental experiences. According to Piaget's voluminous research, interaction of a child with a challenging environment is an over-arching stimulus to the development of increasingly complex thought structures.

Because the Collecting Information cluster field test focused on process outcomes of instruction, one part of the present study investigated the effects of the cluster programs and the pre-viewing and post-viewing instructional experiences on the cognitive structures of 5th and 6th grade students. The methodology and data analysis involve multidimensional scaling techniques.

The questionnaires and data analysis were designed as an exploratory, descriptive study to answer the following questions:

1. What cognitive structure is evident across groups of students with respect to information collection concepts (a) prior to instruction, (b) following instruction involving the Collecting Information cluster programs, and (c) following instruction with television programs unrelated to collecting information?

*See Appendix C for brief introduction to cognitive structure and multidimensional scaling techniques.

2. What changes in cognitive structures result because of the cluster instruction?

Methodology of Questionnaire Development

Two questionnaires were developed to obtain similarity/dissimilarity judgments of all possible pairs of items on two lists. The first list (Form C) in Table IV.12 includes abstract aspects of the information collection process. The second set of items (Form D) are specific activities involved in the process.

Table IV.12
Items on Cognitive Structure Forms

Form C	Form D
A. think of all the things you know about the topic	A. make a list
B. write down all the things you need to do	B. measure something
C. list all kinds of information you could use	C. take notes
D. choose the ways to collect the information	D. read a book
E. ask yourself what you need to know	E. interview someone
F. find out what sources you might use	F. read the newspaper
G. decide where to get the information	G. make a graph
H. figure out which information is easiest to collect	H. read a chart
I. decide which information is most useful	I. give out questionnaires
	J. take a survey

In the first set, the actions were conceptual—figure out, think of, decide, find out, etc. In the second, the actions were more concrete—read, write, make, measure, etc. In the first set, the objects of the action are abstract and non-specific—kinds of information, things you know, where to get information, etc. In the second, the objects were specific—questionnaires, survey, chart, book, etc.

The format of the questionnaires is a modification of the traditional, unidimensional paired-comparisons technique. In the traditional paired-comparison, a person is given a pair of statements and asked to mark her preference or to check the one of the pair that is most typical of something (e.g., a Republican, an ideal self, etc.) In effect, one of the pair is selected on the basis of an attribute. In multidimensional scaling the concepts are paired and each pair is judged on the basis of the similarity/dissimilarity to each other. The individual marking a pair of concepts indicates how similar or different she thinks the concepts are.

A 9-point scale is established similar to the agreement/disagreement item discussed in Appendix C. The following example shows one item which has been created by pairing two statements from Form D:

	most alike				least alike				
	1	2	3	4	5	6	7	8	9
A. make a list									
B. read a book								✓	

The check mark on the 8th space indicates a high degree of dissimilarity.

When all possible pairs are developed for Form C, 36 items result if order of statements is disregarded. The items were randomly ordered on the questionnaire, and in all cases the extreme points of the scale (1 and 9) were labeled MOST ALIKE and LEAST ALIKE. Form D is composed of the 45

possible pairs of 10 items with an identical format to Form C. On both forms, instructions and examples were written on the cover sheet.. (See Appendix B for copies of the questionnaires.)

Early versions of the forms were pretested with small groups of children. The pretest indicated that 5th and 6th graders understood the task, were able to comprehend the vocabulary, follow the examples, and complete the items in less than 30 minutes. No data analyses were attempted on the small number of pretested protocols.

Data Collection

The administration of both Forms C and D proceeded in the manner described for other student data. Teachers were given sample questionnaires and instruction sheets. (See Appendix B for instruction sheets.) The regular classroom teacher worked through the examples given on the cover sheet and supervised administration and collection of the forms. Half of the students in the class received Form C and half received Form D.

The design of this portion of the field test was identical to other student data collection procedures. Both pre- and posttests were administered to one-third of the *ThinkAbout* and control classes. In the pretest-posttest classrooms children received the same form each time it was administered. For one-third of both *ThinkAbout* and control classes, a posttest-only condition was also included in order to observe possible effects of pre-instruction experience with the questionnaire itself.

Results

For each form of the questionnaire, eighteen different multidimensional scaling solutions could be obtained if one were to break the *ThinkAbout* sample into all design components. The number of comparisons across those solutions

would be far too many to report in any succinct fashion. The major portion of this report will emphasize Form D since these results are clearest.

The results from Form C are inconclusive and will be covered only briefly. Further analysis is necessary to make specific statements about the cognitive structures of the children for the abstract, process-oriented statements on Form C.

The results of Form D are discussed first. The three-dimensional character of the configuration is discussed; the four major comparisons are made across time and treatment conditions. Form C is briefly discussed prior to the summary and conclusions.

Dimensionality. The MDS data analysis provided several configurations (geometric representations) descriptive of the similarity/dissimilarity of the items. (See pages C13-C15 of Appendix C.) For each configuration a different number of dimensions described the geometric space involved, and a set of loadings placed each item on each dimension. (See Appendix C, page C14.)

A stress value was also reported for each configuration; stress indicates how well the computer-produced configuration fits the data. In all of the present configurations, three dimensions provide very good to adequate MDS solutions. Kruskal's stress values ranged from 0.030 to 0.077. The loadings of each item on each dimension are the co-ordinates of that item on the three-dimensional figures corresponding to the various *ThinkAbout* and control groups.

Some consistency in the configurations suggested that tentatively naming the dimensions is possible and will be helpful in discussing them. The first dimension seemed to be bipolar and related to ways of collecting information via reading versus ways other than reading ("non-reading."). The "non-reading" activities involved collecting information from people (interview, survey, etc.). The second and third dimensions were less stable, but the second typically related to the quantitative aspects of information collecting, such as measuring. Items

loading moderately high on the third dimension have an active, productive sense of making something, such as a graph, a list, and so on. The lack of stability in the dimensions resulted in an occasional change as to which content items loaded high on which dimension. In some configurations, the active "make" items loaded on the second dimension, and the quantitative items loaded highest on the third. Unlike the bi-polar first dimension, the second and third dimensions may be unipolar (they are not a continuum with an opposite pole), but without further research that conclusions cannot be firm.

Form D: Major Comparisons

The major comparisons demonstrated changes across time and treatment conditions. First, three pretest configurations were compared. The configurations of *ThinkAbout* pretest, control pretest, and combined pretest groups established the initial equality of configurations.

The second comparison contrasted pretest and posttest configurations for the *ThinkAbout* students in the pretest-posttest condition. The effects of the *ThinkAbout* cluster and classroom activities were assessed on the same group of children across the duration of the field test experience.

The third comparison again looked at pretest-posttest students, but this one compared posttest configurations for *ThinkAbout* and control group students. The effect of relevant instruction was contrasted with irrelevant instruction across two groups of students.

The last concern was to examine the effect of the pretest itself on the students who rated the concepts prior to seeing the cluster programs. *ThinkAbout* pretest-posttest students were compared with *ThinkAbout* posttest-only students. Similarly, the control pretest-posttest group was compared with the control posttest-only group.

Equality of Pretest Groups. Before reporting the comparisons of major interest to this evaluation, the equality of the groups prior to instruction

must be demonstrated. Multidimensional scaling analyses were run for the *ThinkAbout* pretest, control pretest, and combined pretest groups.

The pretest configuration for both *ThinkAbout* and control groups combined was quite similar to the configuration produced by either group separately. Similarity can be shown with respect to the high positive and high negative loadings on the three dimensions and with respect to the overall configurations. Such similarity suggested that children, as a group, have an already established cognitive structure with respect to the information collection activities listed on the questionnaire. The equality of groups at the point of pretesting may have been an effect of the two warm-up programs. Figure IV.1 depicts the three-dimensional pretest structure of the *ThinkAbout* students.

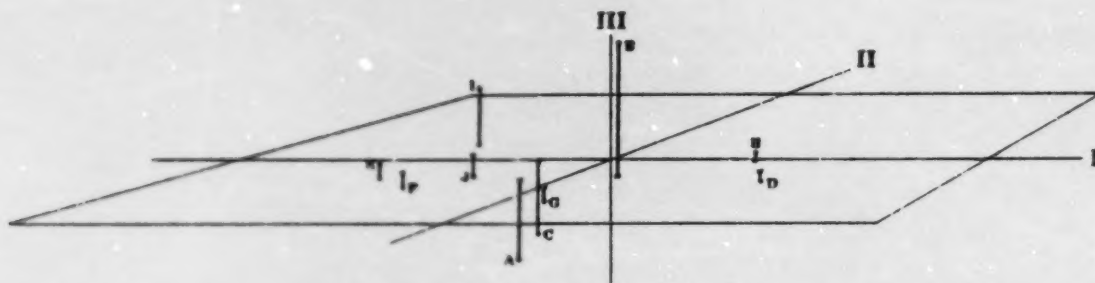


Figure IV.1. *ThinkAbout* pretest cognitive structure representation.*

* Letters correspond to items in Table IV.12, page 54. Solid lines indicate a point positioned above the plane on the two-dimensional surface. Broken lines indicate the point's position below the surface.

ThinkAbout Pre- and Posttest Configurations. The most important changes in cognitive structure were clear in the pre-post *ThinkAbout* group.

From a vague pretest structure which was probably, in part, stimulated by exposure to the *ThinkAbout* warm-up programs, the *ThinkAbout* students' posttest configuration demonstrated both clustering of similar activities and differentiation of others. The definition of the cognitive structure was clearer. (See Figure IV.2.)

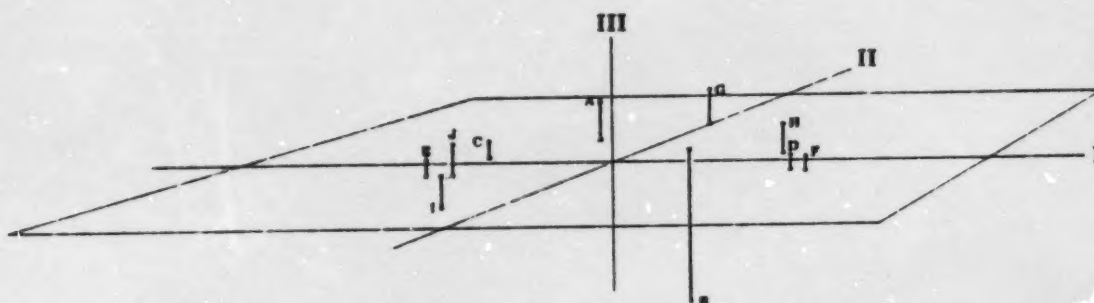


Figure IV.2. *ThinkAbout* pre-post posttest cognitive structure representation.

One cluster of items which converged on the posttest included the following:

- E. interview someone
- I. give out questionnaires
- J. take a survey
- C. take notes

On the pretest, the Item E, I, and J relationships were clearly further apart and Item C was not associated with the cluster at all. On the pretest, Items E and F were almost identical; interviewing was seen as related to reading the newspapers. Children may have been perceiving interviews as what news reporters do, whether on television news programs or in newspapers. After watching the Collecting Information cluster and experiencing related classroom activities, students perceived the two items quite differently. Reading the newspaper was closely clustered with other sources of information which must be read (Items D and H). Interviewing

someone, on the other hand, converged with the other items listed above. On the pretest, taking notes (Item C) was more closely associated with items requiring writing (making a list and making a graph). Afterwards, the posttest configuration showed it to belong with data collection techniques which were related in the programs.

A second cluster formed on the *ThinkAbout* posttest configuration deals with information gathering by reading. Items D, F, and H involve reading a book, the newspaper, and a chart, respectively. Viewing the programs focused the students' awareness on the similarity of these activities. Of particular interest from the standpoint of structuring cognitive process is that Item H is positioned very close to Items D and F on Dimension 1 (reading versus "non-reading"). However, because of the slightly quantitative character of Dimension 2, Item H is pulled slightly apart from the other two items on that dimension. In fact, reading a chart frequently does involve a more quantitative type of reading than does reading from books and newspapers.

One relationship becomes much more distinctive. On the pretest, measure something (Item B) and make a graph (Item G) are fairly close, but on the posttest the distinction between the two becomes particularly clear on the quantitative dimension.

ThinkAbout and Control Posttest Configurations. The effects of relevant versus irrelevant instruction were examined by comparing the configurations of students who had both the pre- and posttest in the *ThinkAbout* and control conditions. The *ThinkAbout* posttest configuration was described in the preceding section.

The control posttest configuration is similar to the control pretest configuration. Little change occurred in the control group over the course of the field test. In Figure IV.3, the moderate degree of clustering of the

reading activities and a similarly moderate degree of clustering among the activities which elicit information from people (Items E, I, J) illustrated a much more diffuse structure than one observed in the *ThinkAbout* configuration. Items B and G (measure something, make a graph) did not become more distinct.

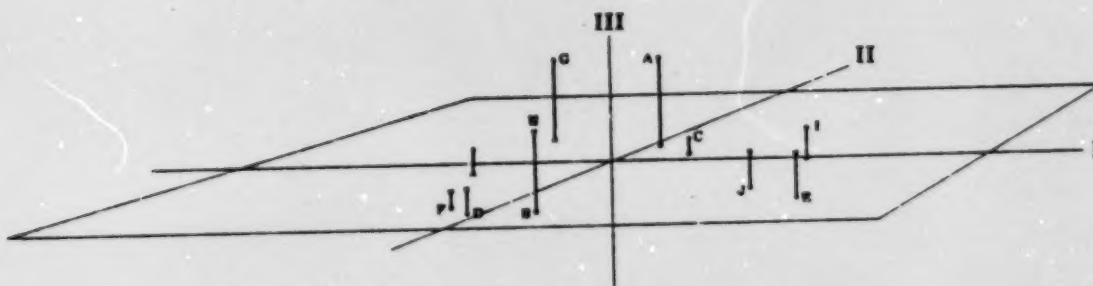


Figure IV.3 Control pre-post posttest cognitive structure representation.

In summary, relevant *ThinkAbout* instruction helped students acquire a more cohesive cognitive structure than did the *bread & butterflies* instruction. Even though the two groups of students demonstrated equivalent loosely organized cognitive structure representations prior to seeing any programs, the post-instruction configurations indicate more dramatic changes in the *ThinkAbout* students. The *ThinkAbout* configuration became more refined.

ThinkAbout and Control Posttest-Only. The posttest-only students had no pretest to provide experience with the items on the test format or to alert them to particular aspects of the television programs.

The posttest-only configurations for both groups are unlike all the pretest patterns discussed above. Furthermore, they differ substantially from post-instruction configurations produced by children who had both pre- and posttesting experiences.

To some extent, the control group configuration is more structured than the *ThinkAbout* configuration. The structure, however, appears "naive." The control group clustered the items dealing with reading and simply distinguished them from everything else. (See Figure IV.4.) Items G, B, A, C, J, and E are not differentiated on the first dimension. They differentiate themselves along the second dimension, which, on this configuration, seems to distinguish the active, product-oriented items from active collection of information from people.

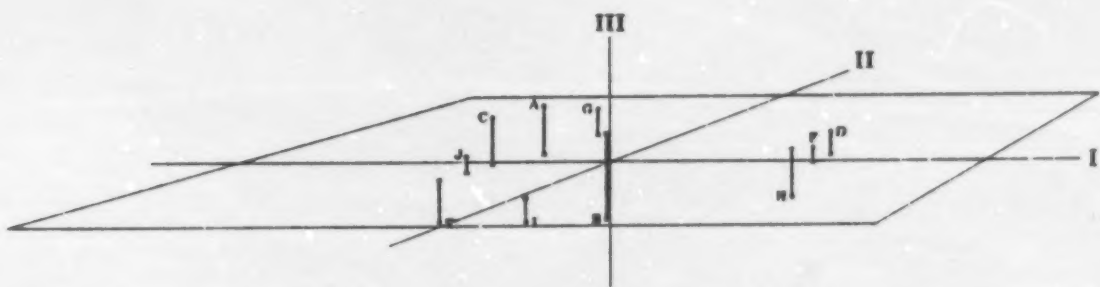


Figure IV.4. Control posttest-only cognitive structure representation.

The *ThinkAbout* posttest-only configuration, on the other hand, is a vaguely defined structure. Without the pretest experience, the posttest-only students seemed to have arrived at a point where all activities are fairly sharply distinguished from one another. The sole exception is that

taking notes (Item C) and making a list (Item A) were seen as almost identical. While the control group evidenced a simple structure differentiating reading from "non-reading," the *ThinkAbout* students seemed to be aware of differences but were unable to group activities by similarities.

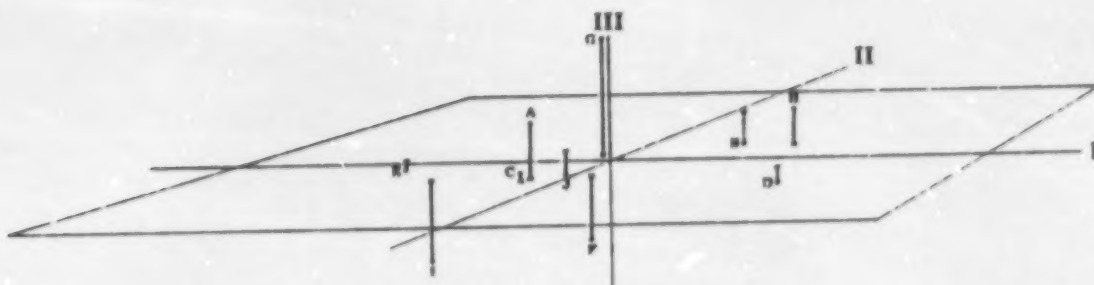


Figure IV.5. *ThinkAbout* posttest-only cognitive structure representation.

The control group students seemed able to impose a simple structure on the information-collecting activities because they have had no relevant instruction to cause them to wonder about the similarities and differences.

Form C: Results

The original intent of creating two sets of items was to allow comparison across abstract, process items and concrete, task-focused items. The comparison is more interesting, and exasperating, than expected.

In the analysis of the data, it quickly became evident that the students' ability to deal with the abstract set of items differ greatly from their ability on the concrete set. On the abstract set, the results were diffuse and inconsistent. Given three testing points (pre, post, post-only)

and the *ThinkAbout* control conditions, seven comparisons were made. On the pretest, the *ThinkAbout* group differed greatly from the control group; the groups could not be said to be equivalent. Looking at posttests for those who received the pretests, the control group differed from its pretest and from the *ThinkAbout* group's posttest. The *ThinkAbout* group also differed from its pretest. In the posttest-only condition, *ThinkAbout* and control groups differed from each other and from the comparable posttests in the pre-post groups.

This gross inconsistency suggests that the task might be too complex and inappropriate for 5th and 6th grade students. Given the developmental stages at which most of these students are currently operating, it is likely that they are more capable of dealing with the specific than the abstract. One could speculate that students are likely to attach a concrete referent to the abstract statements. Over the period of time between pretest and posttest administrations of the MDS form, the concrete referents may change. Consequently, the relationships among abstract process statements would be expected to change. Another speculation sometimes verified in MDS studies is that, in a given testing situation, students rated some item-pairs according to one set of personal criteria and then adopted a new set of similarity/dissimilarity criteria when judging later items on the questionnaire. Stress values are higher for the Form C configurations, suggesting difficulty in obtaining a statistically good fit of the configurations to the data. Even the indicators of appropriate dimensionality are lacking for Form C.

Summary and Conclusions

Cognitive structure is a theoretical concept which deals with the mental organization of information. Instruction is predicted to have an effect of

clarifying or altering cognitive structure so that information is more readily accessible. Efficiently organized cognitive structure is also assumed to allow the integration and retention of new information.

Interest in changes in cognitive structure as a potential outcome of *ThinkAbout* instruction prompted the use of multidimensional scaling procedures. Two sets of collecting information items were constructed, one a set of specific activities and the other a set of more abstracted steps in the information collection processes. After processing the data, three-dimensional solutions were the best representations of the data from task-oriented items. Comparisons were made of configurations in order to assess change in underlying cognitive structure.

The results indicate changes in cognitive structure over time within one group of students who watched *ThinkAbout* programs (the pre-post group). Prior to relevant instruction, *ThinkAbout* students exhibited a loosely organized cognitive structure which might have been prompted by exposure to the warm-up programs. After instruction, two types of changes were evident in children who saw *ThinkAbout* programs. The representation of post-instruction cognitive structure involved new clusters of related activities. Similar activities converged into very close proximity, suggesting the formation of sub-categories. Second, some items were perceived as more different on the posttest than they had been on the pretest. Sharpened distinctions occurred between items thought previously to be rather similar.

Differences were also apparent across the two groups, *ThinkAbout* and control. While the *ThinkAbout* cognitive structure representation became more distinct, the control group representation changed little over the course of the field test. Irrelevant instruction did not markedly change the cognitive structure for collecting information activities.

A third interesting result occurred in the posttest-only group. Students who received the relevant instruction but no pretest to serve as an alerting mechanism tended to see each activity as distinct from the others. The cognitive structure became more diffuse. On the other hand, students who received irrelevant instruction and no pretest to alert them were able to impose a simple, almost naive, structure: activities which involve reading and all others.

In summary then, one important outcome of instruction using the *ThinkAbout* Collecting Information cluster is a more systematic cognitive structure with regard to information collection activities. Changes involve the convergence of similar aspects of information and the distinguishing or sharpening of differences between dissimilar activities.

CHAPTER V

CLASSROOM OBSERVATIONS

This section summarizes three types of classroom observation data. Each type of data was collected to answer specific questions. Two sets of observations were made in classrooms at the time *ThinkAbout* or *bread & butterflies* programs were shown. These observations will be reported together. Another set of observations, made in each classroom at other times throughout the school day, will be reported separately. A brief description of each observation form follows.

Summary Observation Forms

The summary observation forms were developed for use during the television program and during follow-up activities. They are structured (closed-end) questionnaires focusing on the specified lesson criteria. three versions of the form were developed, one specific to each of the cluster programs. (See Appendix B.) They provide parallel information on each program about the essential and desirable outcomes established by the Executive Committee. In addition, selected characteristics of the lesson are recorded for each follow-up activity.

The data are reported for classrooms in which *ThinkAbout* programs were shown and with respect to two variables. One variable, the teacher

orientation condition, was included in the original design, the second variable, classroom organization, was imposed on the data after it was collected. The variable, classroom organization, is divided into departmentalized and self-contained.

The summary observation form was completed for all *ThinkAbout* classes. Data will typically be reported as percentages of responses. The maximum number of classes is 40, but missing data or failure to mark a particular item resulted in some variance for the total number of responses. If the number of missing cases exceeded five, the adjusted percentages were reported.

Narrative Observation Forms

The narrative observation instrument is entirely open-ended. (See Appendix B.) Observers were instructed to note the classroom interaction prior to, during, and after the screening of the television program. They were asked to record notes describing both teacher and student comments at one-minute intervals throughout the pre-viewing and post-viewing lessons.

Narrative observations were done in all *ThinkAbout* classes. Data for these and the summary forms will be integrated as much as possible.

Classroom Context Observation Forms

The context in which *ThinkAbout* will eventually be used is, of course, on-going classroom activity. Consequently, several concerns were expressed by the *ThinkAbout* Executive Committee that prompted the observation of how problem-solving issues are addressed in the regular classroom process.

"Context" observations were done in both *ThinkAbout* and control classes. Rather than have an observer in the classroom 100% of the time, random observations were done throughout the school day in each class. No attempt was made to schedule specifically academic class sessions. Data are reported as percentages of observations.

Criteria for a Successful Program

The Executive Committee was concerned that each program be compelling enough to assure three aspects of follow-up. These constitute criteria for acceptability. First, teachers should provide a 15-minute lesson in conjunction with the program. Second, the lesson should have a focus of either (a) review-and-comprehension of program content or (b) application of program content. The focus of the lesson should be related to the essential and desirable outcomes. The Executive Committee determined that a review-and-comprehension lesson would be an outcome essential for acceptable use of the cluster, while an application lesson would be desirable. Third, at least one collecting information objective or related skill should be treated in each lesson. Recognizing the educator's need to utilize television materials in a manner consistent with individual classroom needs, the criteria for acceptable use allow considerable latitude and flexibility to follow-up.

Differences between the recall-and-comprehension and the application lessons were described to the observers in two ways. For the most part, the terms follow familiar educational usage. The recall-and-comprehension lesson focuses primarily on the first two levels of Bloom's taxonomy for cognitive objectives, factual recall and comprehension. The application lesson focuses primarily on the upper levels of Bloom's description--application, analysis, synthesis, and evaluation.

Another way of expressing the difference is that a recall-and-comprehension lesson focuses on thinking, talking, and/or writing about information collection concepts. An application lesson focuses on thinking, talking, and/or writing about the doing of information collection. Obviously doing an information collection activity would also be an application lesson.

Observations During Periods
When TV Programs Were Shown

General Comments About Observation

The summary and narrative observations were evenly distributed across all design variables. Table V.1 demonstrates the distribution of classes by variables. In addition, the class type is shown to be predominantly departmentalized.

Table V.1

Frequencies and Percentages of Summary and Narrative
Observations by Post Hoc and Design Variables

Variable	Program		
	1	2	3
City			
Kansas City	13 (34.2)	14 (40.0)	14 (40.0)
Knoxville	13 (34.2)	14 (40.0)	12 (34.3)
Syracuse	12 (31.6)	7 (20.0)	9 (25.7)
Teacher Orientation			
Complete	20 (52.6)	17 (48.6)	17 (48.6)
Minimal	18 (47.4)	18 (51.4)	18 (51.4)
Grade Level			
Fifth	18 (47.4)	16 (45.7)	16 (45.7)
Sixth	16 (42.1)	15 (42.9)	17 (48.6)
Grade level not reported	4 (10.5)	4 (11.4)	2 (5.7)
Class Type (Post Hoc)			
Departmentalized	22 (57.9)	23 (65.7)	23 (65.7)
Self-Contained	16 (42.1)	12 (34.3)	12 (34.3)
Total Number of Observations	38(100.0)	35(100.0)	35(100.0)

With respect to the spatial arrangement of classes, most were "traditional" (84%), as opposed to "open" (16%). Both traditional and open classes were proportionately distributed across the complete and minimal teacher orientation classes for all the *ThinkAbout* programs.

Except for Program 2, the traditional and open classes were similarly distributed across class type (either departmentalized or self-contained). No classes reported for Where Should I Go? were both open and self-contained. The majority of screenings (58%) occurred in the morning; thirty-seven percent occurred in the afternoon. In two cases (3%), no time of observation was reported.

In the schools chosen to participate in the field test, 78% of the television sets were color and 22% were black and white. Visual reception was good in 91.7% of the classes over all three programs, and 74.1% reported good audio over all three programs.¹

Results

Results are reported in several sections. First, the entire cluster is reported in relation to the Executive Committee's criteria for acceptability of individual programs. The next three sections discuss each program individually, and the last section summarizes the types and quality of lessons associated with program viewing.

¹ The following comments on problems are reported for information on each program individually. Comments describing problems with the screening of Program 1, What Do I Know? included some correctable equipment problems (e.g., color not adjusted, wrong channel) and one classroom interruption by a local police department program. Two problems were directly related to the *ThinkAbout* videotapes: (a) the printed information early in the program was not distinct enough in two classes, and (b) in three classes observers reported difficulty understanding the audio. In one case the observer attributed poor audio to the television monitor. For Program 2, Where Should I Go? two class observations

Table V.2

Frequencies and Percentages of Teachers
Providing Follow-up Lessons to *ThinkAbout* Programs

	Program		
	1	2	3
All <i>ThinkAbout</i> Teachers			
Follow-up Provided	35 (92.1)	37 (97.4)	32 (94.1)
No Follow-up	3 (7.9)	1 (2.6)	2 (5.9)
Type of Orientation			
Complete Orientation			
Follow-up	20 (52.6)	17 (44.7)	14 (41.2)
No Follow-up	2 (5.3)	0	1 (2.9)
Minimal Orientation			
Follow-up	15 (39.5)	20 (52.6)	18 (52.9)
No Follow-up	1 (2.6)	1 (2.6)	1 (2.9)
Type of Classroom			
Departmentalized			
Follow-up	21 (55.3)	22 (57.9)	20 (58.8)
No Follow-up	2 (5.3)	1 (2.6)	0
Self-Contained			
Follow-up	14 (36.8)	15 (39.5)	12 (35.3)
No Follow-up	1 (2.6)	0	2 (5.9)
Grade			
Fifth			
Follow-up	17 (44.7)	20 (52.6)	15 (44.1)
No Follow-up	3 (7.9)	1 (2.6)	1 (2.9)
Sixth			
Follow-up	18 (47.4)	17 (44.7)	17 (50.0)
No Follow-up	0		1 (2.9)
Missing Data	2 (5.3)	2 (5.3)	6 (17.6)
TOTAL	38(100.0)	38(100.0)	34(100.0)

reported problems. A malfunctioning monitor was reported and one comment was made regarding the "long pause" between the parts of the program. No audio problems were recorded. In regard to Program 3, What Should I Do?, 23 audio problems were reported. All focused on difficulty in understanding the voices. Difficulty was attributed to (1) too much noise in cafeteria scenes; (2) characters talking too fast; (3) lack of synchronization with video; (4) sound fading, and (5) unintelligible speech. Four observations noted video problems with Program 3, but those were reported only in one city. The concerns were "distortion" in the picture, a period of two minutes when no picture appeared, and occasional lack of synchronization between video and audio.

Program Acceptability

Each program is expected to prompt a 15-minute lesson. Table V.2 demonstrates clearly that follow-up does occur for all programs. The table indicates the type of classrooms providing no follow-up, but the number of failures is too small to allow safe generalization.

The requisite length of follow-up was approximated closely by the second and third programs. Table V.3 compares the length prompted by the three programs in terms of the range, average, and percentage of lessons which met or exceeded that criterion.

Table V.3
Length of Follow-up in Minutes for
Collecting Information Cluster Lessons

Program	Number of Classes	Range	Mean	% Lessons 15 minutes and longer
1	33	0-33	11.6	39.4
2	28	1-40	14.3	46.4
3	35	1-43	13.6	45.0
Cluster Average	32	0-43	13.2	43.6

The average lesson length for all programs and all classes is 13.2 minutes. Standard deviations are reported for each program individually in the following sections, and they indicate satisfactory lesson length overall with substantial variability.

Focus of Follow-up Activity

The type of follow-up lesson provided is displayed in Table V.4 for each program by the design and post hoc variables. The review-and-comprehension lesson was considered an essential outcome for acceptability of each program. All percentages are very high for the essential outcome.

Table V.4
Number and Percentage of *ThinkAbout* Teachers
Providing Follow-up Lessons by Focus of Lesson

	Review-and- Comprehension*	Application as a Secondary Focus	Application	Total Number Responses
<i>All ThinkAbout Teachers</i>				
Program 1	33 (94.3)	11 (31.4)	11 (31.4)	35
2	37 (100.0)	28 (75.7)	7 (18.9)	37
3	30 (93.8)	16 (50.0)	8 (25.0)	32
<i>Complete Orientation</i>				
Program 1	18 (90.0)	6 (30.0)	7 (35.0)	20
2	16 (94.1)	13 (76.5)	4 (23.5)	17
3	14 (100.0)	9 (64.3)	5 (35.7)	14
<i>Minimal Orientation</i>				
Program 1	12 (80.0)	5 (33.3)	4 (26.7)	15
2	20 (100.0)	15 (75.0)	3 (15.0)	20
3	17 (94.4)	7 (38.9)	3 (16.7)	18
<i>Departmentalized</i>				
Program 1	20 (95.2)	8 (38.1)	8 (38.1)	21
2	22 (100.0)	15 (68.2)	6 (27.3)	22
3	17 (85.0)	8 (40.0)	7 (35.0)	20
<i>Self-Contained</i>				
Program 1	13 (92.9)	3 (21.4)	3 (21.4)	14
2	15 (100.0)	13 (86.7)	1 (6.7)	15
3	12 (100.0)	8 (66.7)	1 (8.3)	12
<i>Fifth Grade</i>				
Program 1	17 (100.0)	6 (35.3)	5 (29.4)	17
2	20 (100.0)	16 (80.0)	4 (20.0)	20
3	14 (93.3)	8 (53.3)	5 (33.3)	15
<i>Sixth Grade</i>				
Program 1	16 (88.9)	5 (27.7)	6 (33.3)	18
2	17 (100.0)	12 (70.6)	3 (17.6)	17
3	16 (94.1)	8 (47.1)	3 (17.6)	17

* The review-and-comprehension lesson was considered an essential outcome for acceptability of each program.

Application as a secondary focus was determined to be a necessary category after pretesting of the summary observation form. Pretesting indicated some unreliability due to observer confusion. Frequently, teachers are observed to insert application questions or comments in a class review discussion. The inserted questions do not constitute a lesson in themselves, but do constitute application of the educational content in a limited fashion. The figures for application as a secondary focus reflect the types of teacher or student comments that, with awareness and utilization training for the teacher, could be developed into application lessons. Overall, about half the lessons involved application questions even though the main focus was review and comprehension.

The application lesson is a "desirable" outcome for the Collecting Information cluster and *ThinkAbout* as a whole. For each program and for each condition lessons were presented that were judged to be application lessons. Far fewer application lessons were observed than either of the other categories, but about 25% of the lessons focused on application. The result is not unexpected since other teacher behavior and classroom process research has repeatedly demonstrated a concentration on factual recall questions. The last section of the observation report includes qualitative information and examples of lessons.

Use of Specified Teacher Objectives and Related Skills. The third criterion for program acceptability was that at least one teacher objective or related skill should be part of the class follow-up lesson. Table V.5 summarizes that information for the Collecting Information cluster. At least one teacher follow-up objective or related skill was dealt with in 83.5% of the lessons. The percentages differ very little for Programs 1 and 2. However, because several teachers opted to use most of the Program 3 follow-up time for posttesting activities, some drop in the number of

objectives actually covered was observed. These were short review-and-comprehension lessons in some cases.

Table V.5

Frequencies and Percentages of Follow-up Lessons
Involving at Least One Objective or Related Skill

Program	No. Classes Reported	No. (%) Involving Objective/Related Skill
1	39	33 (85.6)
2	36	31 (86.1)
3	34	27 (79.4)
Cluster Average	36.3	30.3 (83.5)

Each program prompted classroom activities that did not touch upon the teacher objectives or related skills. After Program 1, What Do I Know?, one teacher led an affectively-toned discussion about lost pets and the need to care for pets. After Program 2, Where Should I Go?, one class discussed the differences between commercial and public television, and another discussed the sequence of activities each character followed. This borderline case was assessed by the observer as not dealing with the objectives. A similar circumstance was confronted with Program 3, What Should I Do?. One class held a discussion of the program storyline that was affectively oriented, but did not discuss the educational content specifically outlined as objectives or related skills.

The following discussions of individual programs elaborate the information described above. The data are also discussed in light of the design variables and class type.

Program 1

"What Do I Know?"

General Comments

The screening and follow-up of the first program of the Collecting Information cluster was reported for 38 classes. The program was shown to 61% of the classes on Monday, December 4, 1978, and to 39% on Tuesday, December 5, 1978. Morning screenings were conducted for 84.2% of the classes, and afternoon screenings for the remaining classes.

Follow-up Lesson Length

The first criterion for the program was that it prompt a follow-up lesson, and that the lesson be 15 minutes in length.

After Program 1, follow-up lessons occurred in 92.1% of the classes. No follow-up was provided in two departmentalized fifth grade classes that fell in the complete teacher orientation condition. One class was not reported.

The length of follow-up was reported for 33 *ThinkAbout* classes. The modal, or most common, lesson length was 15 minutes with eight classes in that category. The range was 0 to 33 minutes with an average over all *ThinkAbout* classes of 11.6 minutes. Lessons of 15 minutes or longer constituted 39.4% of the reported classes.

If the sample of classes is separated according to teacher orientation condition, the Table V.6 data result for the length of follow-up lesson. The difference in average lesson length is not statistically significant. In about two-thirds of the classes in the complete orientation condition, lesson length ranged from 5 to 20 minutes. The range of two-thirds of the minimal orientation classes was from 3.5 to almost 18 minutes.

Table V.6

Length of Follow-up Lesson for Program 1
by Teacher Orientation

Orientation Condition	No. of classes Reported	Mean (min.)	Std Dev (min.)
Complete	15	12.8	7.15
Minimal	18	10.7	7.17
TOTAL	33	11.6	7.14

When classes are analyzed post hoc as either departmentalized or self-contained, the results are virtually identical (Table V.7). Again, the differences are not statistically significant.

Table V.7

Length of Follow-up Lesson for Program 1
by Class Type

Type of Class	No. of Classes Reported	Mean (min.)	Std Dev (min.)
Departmentalized	20	12.2	7.0
Self-Contained	13	10.8	7.5
TOTAL	33	11.6	7.1

Type of Follow-up Lesson

The essential outcome of a review and comprehension lesson was met in 94.3% of the Program 1 follow-ups.

Table V.8

Treatment of Program 1
Teacher Objectives and Related Skills by Entire
ThinkAbout Sample, Teacher Orientation, and Classroom Type

Treatment of Program	Teacher Orientation ^a		Classroom Type ^a		ThinkAbout Total ^a
	Complete #(%)	Minimal #(%)	Department #(%)	Self-Contained #(%)	Sample #(%)
Total Number of Classes	15 (100.0)	16 (100.0)	19 (100.0)	12 (100.0)	31 (100.0)
Total Number of Skills & Objectives Treated ^b	32 (213.4)	32 (200.1)	43 (226.3)	21 (175.0)	64 (206.5)
Objectives & Related Skills:					
determining information needs	14 (93.3)	16 (100.0)	19 (100.0)	11 (91.7)	30 (96.8)
planning for an information collection activity	10 (66.7)	9 (56.3)	13 (68.4)	6 (50.0)	19 (61.3)
related skill: use of standard reference aids: classified ads	7 (46.7)	5 (31.3)	8 (42.1)	4 (33.3)	12 (38.7)
other topics	1 (6.7)	2 (12.5)	3 (15.8)	0 (0.0)	3 (9.7)
Average Number of Skills & Objectives Treated	2.1	2.0	2.3	1.8	2.1

^a Percentages computed on the basis of the number of classes treating each objective

^b Percentages exceed 100.0% because more than one objective was treated in most classes.

Almost one-third of the classes made some application of program material. Application questions inserted into review-and-comprehension lessons were observed in 31.4% of the cases; 31.4% also evidenced application lessons.

Teacher orientation condition had no apparent effect on the type of follow-up lessons provided. The lessons of departmentalized classes involved more application lessons and more application as a secondary focus. Grade level differences in percentages are obviated by the small numerical differences; percentages show fifth grade classes providing more review-and-comprehension and application as a secondary focus, while sixth grade classes appear to provide more application lessons.

Treatment of Objectives and Related Skills

The third criterion for an acceptable program was the use of at least one specified objective or related skill in each follow-up lesson. For Program 1, What Do I Know? all 31 reported cases treated at least one teacher-oriented objective for the program. In most cases, multiple teacher objectives were touched upon in lessons.

The specific objectives and related skills for Program 1 follow-up lessons are summarized in Table V.8. Percentages are based on the number of classes treating each skill and objective. Since most dealt with more than one objective, the total is about 200%. For example, all 19 (100%) departmentalized class follow-ups dealt with determining information needs. Of those 19 classes, 13 (68.4%) also dealt with planning for an information collection activity. The related skill was mentioned in eight (42.1%) of the 19 classes, and so on. On the average a little more than two objectives were treated in a lesson. Virtually all classroom activities reported dealt

with the first information processing objective—determining information needs.

The first teacher objective—determining information needs—can be approached from either of two directions: (a) solving a problem or (b) pursuing an interest. In addition, a given classroom might consider some other information need unspecified by the objective. Virtually all follow-up lessons focused on problem-solving, with only 20% of the lessons dealing with pursuit of interest. Three departmentalized minimal orientation classes discussed an information need not specifically mentioned in components of the teacher objective.

The second information collection objective—planning for an information collection activity—can also be approached in two ways. The focus could be on either the value of planning or the techniques of planning an information collection activity. Self-contained classes focused more on the value of planning than did departmentalized classes, which more commonly discussed techniques for planning. Complete orientation class observations revealed more interest in both value of and techniques for planning information collection. In all of the comparisons described above, the number of classes is small, so the results might change if a larger sample were involved. When major objectives are subdivided, little difference is seen across either the orientation or type of classroom conditions.

Program 2

. "Where Should I Go?"

General Comments

Screening of and follow-up of the second program in the Collecting Information cluster was reported for 35 classes. The program was shown to 62% of the classes on Wednesday, December 4, 1978; on Thursday December 7, 1978, the remaining 38% of the classes viewed the program. Morning screenings were held for 88.5% of the classes, afternoon screenings for the rest.

Follow-up Lesson Length

The first criterion for an acceptable program was that it prompt a follow-up lesson, and that the lesson be 15 minutes in length.

After Program 2, follow-up lessons occurred in 97.4% of the classes. The length of the follow-up was reported for 28 *ThinkAbout* classes. The modal, or most common, lesson length was 10 minutes with five classes in that category. The range was from 1 - 40 minutes, with an average over all *ThinkAbout* classes of 14.3 minutes. Lessons of 15 minutes or longer constitute 46.4% of the reported classes. Two follow-up lessons which occurred at a time other than immediately after the program were in the minimal orientation group.

If the sample of classes is divided by the teacher orientation condition the following data result for the length of the follow-up lesson. As Table V.9 below indicates, the complete orientation teachers provided a follow-up lesson averaging 16.8 minutes, which is slightly better than the criterion originally set by the Executive Committee. Minimal orientation teachers fell somewhat below that level with an average lesson length of 12.4 minutes. The analysis of variance indicates no statistically

Table V.9
Length of Follow-up Lesson for Program 2
by Teacher Orientation

Orientation Condition	No. of Classes Reported	Mean (min.)	Std Dev (min.)
Complete	12	16.75	6.43
Minimal	16	12.44	9.12
TOTAL	28	14.29	8.23

significant difference between lesson lengths ($F=1.95$, $p=.17$). It is interesting to note that the variability of the lesson length for minimal orientation teachers was substantially greater than that for complete orientation teachers. In other words, complete orientation teachers were more uniform in providing lessons ranging roughly from 11 to 23 minutes. That range would encompass one standard deviation or about two-thirds of the teachers in the complete orientation. For the minimal orientation about two-thirds of the classes provided follow-up lessons ranging from 3 to 21 minutes.

Departmentalized classes represented 64.7% of the Program 2 summary observations, while self-contained represented only 35.3%. Consequently, the 22 departmentalized classes numbered almost twice as many as the self-contained classes, and results will be weighted accordingly.

When classes are analyzed post hoc as either departmentalized or self-contained, average lesson lengths are similar to those for the minimal and complete teacher orientation conditions. Table V.10 indicates a small difference in the average length of follow-up lesson favoring self-contained classrooms. However, the analysis of variance indicates no significant difference statistically. The range of one standard deviation around the

mean indicates that average lesson length would vary similarly in both conditions. Departmentalized teacher lessons varied from 6.9 minutes to 22.03 minutes, and self-contained classrooms teachers provided follow-up lessons ranging from 7.4 minutes to 23.4 minutes.

Type of Follow-up Lesson

Type of lesson was reported for 37 classes, and 100% of those reported reviewed the program content. Thus, that essential criterion was met by all reported classes.

Table V.10
Length of Follow-up Lesson for Program 2
b. Type of Classroom

Type of Classroom	No. of Classes Reported	Mean (min.)	Std Dev (min.)
Departmentalized	16	13.46	8.57
Self-Contained	12	15.42	7.98
TOTAL	28	14.29	8.23

The desirable outcome—program application—was relatively well achieved. As a secondary lesson focus, 75.7% of the classes discussed application topics, substantially more than for Program 1. Application lessons occurred in fewer classes (18.9%).

Teacher orientation had little effect on the type of follow-up for Program 2. A slight difference favored the complete orientation group in providing application lessons. The data for type of classroom is inconsistent in that more self-contained classroom observations reported

application as a secondary focus while more departmentalized classes were involved in application lessons. Grade had no effect on the frequency of any lesson type.

Treatment of Objectives & Related Skills

For Program 2, Where Do I Go?, 32 valid classes were reported with three unreported classes. Similar to the first Collecting Information program, more than one objective or related skill was focused upon in many classes. Table V.11 summarizes the total group treatment of objectives and skills and the breakdowns by teacher orientation and classroom type.

Follow-up lessons for Program 2 utilized both of the problem-solving process objectives about equally often. Related skills (R.S.) were considered less frequently than process skills, but R.S.1 (Locating Print Reference Materials) was used more often than the related skill in Program 1. Percentages indicated that departmentalized classes focused follow-up more on related skills than did self-contained classes. The use of other topics increased for all sub-groups and the entire sample in comparison to Program 1.

The first process objective has three parts; the value of planning an information collection activity can be reviewed in terms of (a) types of sources, (b) locating sources, and (c) selecting an appropriate source. Content related to one of the parts of this objective was included in 25 lessons. All three parts were included in a large majority of lessons over the entire sample. No differences appeared with regard to teacher condition. Percentages for departmentalized class lessons indicated more use of all three parts in self-contained lessons.

Table V.11

Treatment of Program 2
Teacher Objectives and Related Skills by Entire
ThinkAbout Sample, Teacher Orientation, and Classroom Type

Treatment of Programs	<u>Teacher Orientation^a</u>		<u>Classroom Type^a</u>		<u>ThinkAbout Total^a</u>
	Complete #(%)	Minimal #(%)	Department #(%)	Self-Contained #(%)	Sample #(%)
Total Number of Classes	16 (100.0)	16 (100.0)	22 (100.0)	10 (100.0)	32 (100.0)
Total Number of Skills & Objectives Treated ^b	41 (256.3)	44 (275.1)	64 (290.9)	21 (210.0)	85 (265.6)
Objectives & Related Skills:					
value of planning an information collection	10 (62.5)	13 (81.3)	16 (72.7)	7 (70.0)	23 (71.9)
techniques of planning an information collection activity	12 (75.0)	12 (75.0)	16 (72.7)	8 (80.0)	24 (75.0)
related skill: locating print reference materials	8 (50.0)	9 (56.3)	14 (63.6)	3 (30.0)	17 (53.1)
related skill: using standard reference and - encyclopedia	6 (37.5)	6 (37.5)	10 (45.5)	2 (20.0)	12 (37.5)
other topics	5 (31.3)	4 (25.0)	8 (36.4)	1 (10.0)	9 (28.1)
Average Number of Skills & Objectives Treated	2.6	2.8	2.9	2.1	2.7

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^a Percentages computed on the basis of the number of classes treating each objective.

^b Percentages exceed 100.0% because more than one objective was treated in most classes.

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The second process objective can be related to the same three emphases. Lesson content relating to the techniques of planning an information collection activity in terms of one or more of the three parts was reported in 26 observations. Substantial attention was given to techniques of planning in terms of (a) types of sources in all follow-up lessons. Departmentalized classes differed from self-contained only on this aspect of the objective. Percentages favored the minimal orientation group for both (a) types of sources and (b) locating sources. Complete orientation was favored for techniques of planning in terms of (c) selecting an appropriate source.

Program 3

"What Should I Do?"

General Comments

The screening and follow-up of the third program of the Collecting Information cluster was reported for 35 classes. The program was shown across three days because of scheduling problems in three of the classes. On December 8 the program was shown to 16 classes; on December 11 it was shown to 17. Two classes are noted as viewing the program on Tuesday, December 12. The program was shown to 86% of the classes in the morning and to 14% of the classes in the afternoon.

Follow-up Lesson Length

After Program 3, follow-up lessons occurred in 94.1% of the reported classes. Two classes did no follow-up. One complete orientation departmentalized class reported follow-up at a time other than immediately following the program.

The length of follow-up was reported for all 35 *ThinkAbout* classes. The modal, or most common, lesson length was 5 minutes, with 6 classes falling in that category. The range was from 1 to 43 minutes with an overall average of 13.6. Nearly half (45%) of the follow-up activities were 13 minutes or longer.

If the sample of classes is separated by teacher orientation condition, the following data result for the length of follow-up lesson. Table V.12 indicates virtually no difference between the average length of lesson across the complete and minimal teacher orientation. Variability of lessons is somewhat greater for minimal orientation teachers orientation. Variability of lessons is somewhat greater for minimal orientation teachers as it was in Program 2.

Table V.12
Length of Follow-up Lessons for Program 3
by Teacher Orientation Condition

Type of Classroom	No. of Classes Reported	Mean (min.)	Std Dev (min.)
Complete	14	13.71	8.74
Minimal	15	13.40	11.65
TOTAL	29	13.55	10.17

When classes are analysed by class type, the results are quite similar (Table V.13). The difference between average lesson length for the two groups is not statistically significant. The number of departmentalized classes far exceeds the number of self-contained which may contribute to the greater variance in departmentalized lesson length.

Type of Follow-up Lesson

For Program 3, 93.8% of the observed follow-ups included a review-and-comprehension lesson; thus one of the essential criteria for program acceptability was met. Half of the classes were observed to apply program content as a secondary focus, and 23% engaged in activities judged to be application lessons.

While teacher orientation did not affect the number of review and comprehension lessons, percentages indicate twice as many application lessons and applications as a secondary focus for the complete orientation classes. Classroom type did not differentiate type of follow-up except on application lessons. The departmentalized classes more often had application lessons than did self-contained classes, but the number of cases is too small to safely generalize. Grade level showed no differences.

Table V.13
Length of Follow-up Lessons for Program 3
by Type of Classroom

Type of Classroom	No. of Classes Reported	Mean (min.)	Std Dev (min.)
Departmentalized	20	13.90	11.00
Self-Contained	9	12.78	8.57
TOTAL	29	13.55	10.17

Treatment of Objectives and Related Skills

Attention to one or more of the reasoning objectives or related skills was observed in 25 lessons. Ten classes were unreported. Table V.14 summarizes the 25 classes providing a lesson which touched on one or more of the objectives; the breakdowns by orientation and class type are also provided.

Most attention across the entire sample of Program 3 lessons was focused on the first process objective—ways to gather information. About three-quarters of the lessons also dealt with one or both of the other process objectives. Of the smaller number of lessons dealing with related skills, the first—reading and making a bar graph—was referred to most often.

With one exception, percentages indicated little difference across orientation condition. More complete orientation lessons involved the first related skill—reading and making a bar graph.

The percentages of departmentalized classes treating the process objectives were greater than those of the self-contained classrooms. No significant differences occurred for use of related skills.

Table V.14

Treatment of Program 3
Teacher Objectives and Related Skills by Entire
ThinkAbout Sample, Teacher Orientation, and Classroom Type

Treatment of Program	Teacher Orientation ^a		Classroom Type ^a		ThinkAbout Total ^a
	Complete #(%)	Minimal #(%)	Department #(%)	Self-Contained #(%)	Sample #(%)
Total Number of Classes	11 (100.0)	14 (100.0)	15 (100.0)	10 (100.0)	25 (100.0)
Total Number of Skills & Objectives Treated ^b	38 (345.5)	46 (328.8)	56 (283.4)	28 (280.0)	84 (336.0)
Objectives & Related Skills:					
ways to gather information	10 (90.9)	13 (92.9)	15 (100.0)	8 (80.0)	23 (92.0)
collecting information specific questions by survey	8 (72.7)	11 (78.6)	13 (86.7)	6 (60.0)	19 (76.0)
interviewing resource persons to get specific information	8 (72.7)	10 (71.4)	12 (80.0)	6 (60.0)	18 (72.0)
related skill: reading & making bar graph	6 (54.5)	4 (28.6)	6 (40.0)	4 (40.0)	10 (40.0)
related skill: finding the arithmetic average	3 (27.3)	3 (21.4)	4 (26.7)	2 (20.0)	6 (24.0)
other	3 (27.3)	5 (35.7)	6 (40.0)	2 (20.0)	8 (32.0)
Average Number of Skills & Objectives Treated	3.5	3.7	3.7	2.8	3.4

^a Percentages computed on the basis of the number of classes treating each objective.

100^b Percentages exceed 100.0% because more than one objective was treated in most classes.

Qualitative Assessment

Characterization of the typical follow-up lesson is necessarily abstract. Both summary and narrative observations confirm that teacher-led discussions, with students responding to teacher questions, dominated the style of the follow-up. The content of the discussions most frequently included a review of program events, a review of the mnemonics, a review of the steps characters in the *ThinkAbout* cluster took to solve problems.

In about one-third of the lessons, some application questions were asked and/or an application activity occurred. In many cases, the mnemonic was used to structure the application tasks. Classes rated as regular TV users did more program application overall than those reporting little use of classroom television. Having the *ThinkAbout* teacher guide materials and the more complete orientation meeting enhanced the degree of application. Having either the guide and complete orientation or being a regular television user had roughly comparable effects.

In addition to what was frequently observed in follow-up lessons, broad subjective categories of lesson quality were constructed by an independent analyst. These criteria incorporated program outcomes, the questions and activities suggested by the teacher's guides, the length and quality of discussion, and the comprehensiveness of the program review. Categories were broad; decisions were based solely on narrative materials.

A "good" lesson meant one in which the teacher understood the program content (skills and outcomes), was well-prepared, and made some attempt at application. It also meant one that included an adequate review of program events and concepts. The class discussion was full, well-structured: the teacher asked good, leading questions and the class responded well. A very sophisticated, well-structured, full discussion was rated exceptional

though that category does not appear in this summation. The evaluating analyst gave lower ratings to classes in which teachers lectured extensively.

An "adequate" lesson was one in which the teacher lectured excessively and/or the class review of the program was cursory, incomplete, or less structured than "good" lessons. "Adequate" lessons rarely included attempts at application. The teacher was prepared sufficiently to review program events, but did not review program concepts or take those concepts beyond the specific context of the program.

An "inadequate" lesson was one in which the narrative indicated a poor or very superficial review of program events and in which no applications were attempted. The discussion was minimal and unfocused. Activities did little to focus on specified teacher objectives or related skills. If no lesson was conducted or if the posttest replaced the lesson, that fact is recorded.

Table V.15 displays the percentages of lessons over all *ThinkAbout* programs subjectively appraised to be of each quality category. Teacher orientation has an effect with greater lesson quality appearing in the complete orientation group and lesser quality in the minimal orientation group.

This descriptive categorization is useful as a rough index to a program's success in the classroom. It summarizes and reduces the narrative data to a quick overall assessment of the lesson. Obviously such judgments are best supplemented by anecdotal information. The following section provides excerpts from narratives to exemplify the criteria used in the categorization. The student comments frequently contain slashes indicating comments by more than one student.

Table V.15

Percentage of *ThinkAbout* Lessons Judged for Quality
by Teacher Orientation and Type of Classroom

	Lesson Quality		
	"Good"	"Adequate"	"Inadequate"
Teacher Orientation			
Complete (n=47)	59.6	27.7	12.8
Minimal (n=52)	30.8	40.4	28.8
Type of Classroom			
Departmentalized (n=62)	46.8	30.6	22.6
Self-Contained (n=37)	40.5	40.5	18.9
TOTAL Sample	44.4	34.3	21.2

N=99

Narrative Lesson Excerpts. The typical "good" lesson included a detailed, well-structured review of program events and concepts, as this exchange from one classroom illustrates:

Teacher: How would you summarize the problem that the students in Program #3 were trying to solve?

Student: How to find a better lunch.

T: What do you mean by "better?"

S: How to find a better lunch that students will like.

T: What do we mean by "balanced diet?"

S: One with vitamins that tastes good.

T: What are the basic foods?

S: Milk/Cereal/Meats/Vegetables.

T: How would you find out?

S: Look it up in a health book.

- T: Yes, "look up" — that's very important.
What was the questionnaire about?
- S: They checked the least-liked lunches and wrote them down./
Interviewing foods the kids liked most.
- T: Was the questionnaire successful?
- S: No. He didn't get them back.
- T: Did they just think and talk?
- S: No. They wrote their sources down on paper./They divided
the work./They wrote things down.

This excerpt from an uncharacteristically long discussion (25 min.) shows clearly the value of a well-structured review. Not only are the program events recalled, but the teacher makes a special effort to clarify the problem-solving and information-gathering techniques used in the program; concepts covered include precisely articulating the problem, finding out what you know, finding out what you need to know, deciding how to proceed, and so forth. In this case, the review proceeds without direct use of the mnemonic.

More typical of the class discussions is this exchange:

- T: The program (#1) emphasized two things: what were they?
- S: What do you know?/What do you need to know?
- T: What was the first problem?
- S: A lost dog.
- T: What did they know?
- S: Interview people./Listen for radio lost and found./Knew to report it.
- T: What else?
- S: Dog liked going certain places, so they checked those./
Knew how long the dog was gone./Someone left the gate open.

- T: What did they need to know?
- S: Where to find it./How far he went./Where to report lost
 dogs./Where the dog was last seen./How to use newspaper.
- T: How to use reference skills!

Although the teacher was perhaps too eager to make the general application (how to use reference skills), using the mnemonic as basis for discussion results in a review of program events and engages students in the problem-solving process.

"Good" lessons often involved direct attention to program concepts. In addition to a thorough and well-structured review of program events and concepts, "good" lessons often showed teachers emphasizing the specific sources of information explored in the programs and having the class suggest other potential sources. In one class, the teacher and students wrote lists of sources and then compared their lists; in most classes this enumeration was part of the class discussion. In the first excerpt, the warm-up program, Brainstorming, was tied to a Collecting Information program. The teacher used student comments to begin distinguishing techniques from one another in order to refine the students' comprehension.

Program #3

- S: They were brainstorming.
- T: Yes, that's right, they could have been brainstorming.
 Did we see a brainstorming session similar to the one
 earlier tape?
- S: Sort of.
- T: They may have had more discussion than we saw. We saw
 them collecting information. Could be brainstorming but
 different.
- S: Sort of like in the U.F.O. film because they wrote
 everything down.

Or identifying related skills:

Program #1

T: What did he do next?

S: He called the radio station.

T: What skill is that?

S: English/Brainstorming/Math/Dialing a Telephone/
Describing the Dog/ Collecting Data.

T: Reporting data. What data did he collect?

S: Measurements/Centimeter/Metric/Color/Age.

"Good" lessons also included some attempt to apply the concepts of the program, although typically in an activity nearly identical to the program situations. Among the related activities were those in which the teacher asked the students to determine the cause of death of the classroom guppies, to draw up a new floor chart for the classroom incorporating newly arrived furniture and to apply information-gathering techniques toward researching class social studies, plays, and science projects. More frequently, however, "good" lessons asked students to apply concepts from the programs by involving them in solving problems identical to the ones in the programs:

T: If you had been in either situation of the lost dog or the UFO story, what would you have done?

S: I would have checked around more at the place where they spotted the UFO, I would have checked the time, made pictures; they wasted time talking./I would have gone to tell someone./I would have followed the light./I would have thrown something at it to see if it was solid./I wouldn't have told anyone until I found more evidence because no one would believe me.

T: Would anyone have done something later on, after it happened?

S: I would put an ad in the paper to see if anyone else saw it. I would go home and I'd turn on the morning news and read the paper to see if anything was said.

Other lessons asked the students to suggest solutions to problems involving lost books and schoolboxes or had the students conduct informal or impromptu polls of cafeteria menu preferences.

Normative distinctions can be made, too, concerning the application portion of the lesson itself. A "good" application lesson tried to provide a problem-solving and information-gathering activity as involving to students as the characters were involved in the programs. Degree of involvement in, or articulation of, the process of problem-solving and information gathering was judged a positive attribute of application discussions.

The narrative samples cited above are typical lessons and provide examples of a few of the ways conceptual information in the programs was further developed in classroom discussions and related activities. These selections have come from "good" lessons and give some indication of the potential of the programs in the classroom.

"Good" lessons were distinguished from "adequate" lessons. The difference between the two was often a matter of the thoroughness of program review, the structure and range of discussion, and the lesson's completeness. The following narrative can serve as an illustration:

- T: How did you like this one? (Program #2)
- S: (Speak all at once.)
- T: Talk one at a time. I have only two ears and one brain.
- S: This one is best./It should have more of an end to it;
they cut it off too soon/I liked it when they followed
up on the clues./Science fiction./I thought it was too
confusing.
- T: In what way?
- S: First they say it's a UFO and then at the end it's not./
I liked them telling you how to use facts and how to do it./
I would have liked to have seen how they put it in the sky.

T: What did it turn out to be?

S: A hologram reflected on the clouds by a laser beam.

T: What about the dogs?

S: They were barking funny because of the high-pitched sound.

T: What did Marty use before he really got into researching?

S: He used math to see how much a phone call would cost. He thought it cost too much.

T: What other source would he use other than calls?

S: Write letters.

T: Do you think using math was a good idea?

S: Yes.

T: What should you do before you make a call?

S: Ask your parents' permission

T: I think he was smart in getting the information before making a call. What did they discover that was thought to be a UFO?

S: A garbage can lid.

T: Does this give you any more ideas about getting information sources... to write things down, sort things out and then use the best things you have?

T: Where did they go to find sources?

S: The library./A building.

T: What did he have to do to get his brother to drive him around?

S: He offered to do the dishes for each hour his brother drove him.

T: In the program we saw how math could come in when using your sources.

This is the complete narrative of a ten-minute lesson (about two minutes shorter than the average lesson length), and qualitative characteristics of an "adequate" lesson are apparent. The teacher conducted a recall-and-comprehension lesson, made certain the students understood certain events in the program, and applied the program material to a specific curriculum area (mathematics).

The lesson is considered only "adequate" for the following reasons:

- a) The teacher's questions did not open up the discussion to a review of specific, significant program events (some events are singled out, but they may not be the most significant.)
- b) The teacher did not ask the students to recall the problem-solving and information-gathering skills.
- c) The applications (mathematics, making a phone call) were rather limited considering the potential demonstrated by other discussions.
- d) The teacher summarized some of the program skills, but not as a summary of the class discussion. She asked a question which calls for a yes/no response and not for specific ideas from the class. (The question goes unanswered.)

In the typical "adequate" lesson, the class discussion of program events and content was cursory or incomplete by comparison with "good" lessons. The "adequate" lesson only occasionally included applications and had limited or no review of program concepts. "Adequate" lessons achieved at least one program outcome, although "good" lessons were much clearer and more consistent in this regard.

"Inadequate" lessons failed to meet any of the criteria of a "good" lesson. In most cases the decision to rate a lesson as "inadequate" was clear-cut, as in these three complete narratives:

Lesson A:

- T: What can we learn from this program? (#1)
- S: How to get lost dogs.

T: What did they do?
 S: They called the animal shelter and the police.
 T: What was the question asked?
 S: What do I know -- what do I need to know?
 T: The need to know is what
 S: ...

Lesson B:

T: Did anybody get anything out of this film? (#1)
 S: ...
 T: What did you learn? Who did learn?
 S: If a dog is lost, there are many ways to find him./Think before you do something.
 T: Anyone else? Norma, Billy, Lisa...
 S: ... There are many ways to do something.
 T: Okay. That's it.

Lesson C:

T: What did you think about this program? (#2) Did you like it?
 S: It was okay with me./It was in-between.
 T: What were they doing?
 S: They were trying to find out about the UFO.
 T: What were the three questions asked?
 S: What do I know?/What should I know?
 T: How would it apply to you?
 S: The show was corny (general talking).
 T: Go back to the film with the lost dog.
 S: It was too fast to find the dog on that TV program. That is so corny.

T: But there was information in the film.

S: I hated the junk./It was stupid./The way it was done was corny.

Discussions during "inadequate" lessons were uniformly poor -- halting, unstructured, vague. In the first example, the mnemonic was repeated, but in most inadequate lessons, program information was only selectively recalled or recalled in a garbled form that often went uncorrected by the teacher. At the end of one brief discussion, a teacher summarized the entire cluster, "In all the films we have seen, planning has been important." The comment was supportive of one main idea of the educational message intended by the cluster, but without further elaboration, it was not considered an adequate treatment of the instructional materials.

Summary and Conclusions

During the showing of *ThinkAbout* or *bread & butterflies* programs, two types of observation data were recorded. A running narrative was made of classroom interaction, and observation of specific details were recorded as a means of judging the acceptability of the programs in the cluster. The criteria for acceptability were provided to the evaluators by the Executive Committee.

The criteria for program acceptability involved the type of follow-up prompted by the program. Each program should prompt a 15-minute lesson which would focus on review-and-comprehension of program content, including at least one program objective or related skill. The requisite length of lesson was closely approximated by Program 2 and 3 and fairly well approximated by Program 1. The average lesson length for the cluster was 13.2 minutes. Forty percent of the Program 1 lessons were 15 minutes or longer. Follow-up occurred in 94.5% of the 110 *ThinkAbout* lessons observed during the entire field test.

Lessons were judged by observers to focus on either review-and-comprehension or application. Review-and-comprehension was viewed as an essential program criterion; application was a desirable outcome. The essential review-and-comprehension lesson was observed in 96.2% of the 104 lessons reported. One-quarter of the reported classes provided clear application lessons, and 52.9% included application questions in the review-and-comprehension lesson.

The third criterion was the use of at least one specified objective or related skill in each lesson. That was the case in 83.5% of the cluster lessons. The major objectives focused on across the cluster were determining information needs, the value of and techniques for planning an information collection activity, and ways to collect information. Related skills were focused on about half as often as objectives; the most frequently discussed related skills were locating print reference materials (53%), reading and making a bar graph (40%) and use of classified ads (39%).

Teacher orientation affects neither the frequency of follow-up nor the type of lesson provided. The specific objectives or related skills discussed in lessons are not dependent on the orientation condition. However, the quality of lesson provided is clearly related to having attended a complete orientation meeting and to use of the entire Collecting Information cluster teacher's guide. The minimal orientation classes demonstrated fewer "good" lessons and more "adequate" lessons; the reverse relationship was observed in the complete orientation classes.

Although departmentalized classes seemed to do more application of program content, the number of self-contained classes reported was quite small. The type-of-classroom analysis was post hoc and conclusions are only tentative because of the imbalance in numbers of each type of class.

In summary, then, the Collecting Information cluster meets the criteria for acceptable programs. The importance of teacher preparation must be underscored. Meeting the criterion of focus on specified educational objectives or related skills and providing a good quality lesson is dependent on the adequate orientation of teachers to the Collecting Information cluster and the *ThinkAbout* series.

Observations of Regular Classroom Activity
When Programs Were NOT Being Shown

An issue which is extremely difficult to assess but which is of importance to both product developers and consortium agencies is the potential of the *ThinkAbout* series to influence classroom process.

One expectation for *ThinkAbout* is that the concepts presented will be integrated into many curriculum areas. For example, the Collecting Information cluster can be applied to any curriculum area in which information is necessary for solving problems and in which that information is not already known by the student. The "What Do I Know?" question can establish the students' knowing or not knowing relevant information regardless of whether the problem is finding a metric equivalent in math class, the biological family name of goldfish in science, the influences in migration of settlers for social studies, or career information in an area of personal interest.

How much the *ThinkAbout* programs were mentioned in classes at times other than the screening and follow-up is an initial measure of the potential generalized impact of the series.

The following questions were examined in the observations of classroom context:

1. Are problem-solving and study skills issues addressed in typical classroom lessons? What is an estimate of the amount of time devoted to these issues?
2. What use was made of program content in regular classroom activities?
3. Do differences appear when comparisons are made between *ThinkAbout* and control group observations? Teacher orientation conditions? Departmentalized *ThinkAbout* vs. self-contained *ThinkAbout* classes?

Procedures

The observation of classroom context occurred during the two weeks of the field test, but in periods other than when the programs were shown. For instance, in a given Classroom A, a program might have been shown at 10:00 a.m. with a pair of observers present to record data reported in the earlier section of this report. At perhaps 2:00 p.m., a single observer would return to the classroom to collect what we have called a "context observation." The observer would remain in the classroom for forty minutes, noting the occasions in which discussion topics arose which are of particular relevance to *ThinkAbout*. Both general problem-solving topics and specific comments regarding the television programs were recorded.

The time of day was originally selected at random from schedules of classroom periods sent to AIT prior to the field test. Because of the unanticipated departmentalized classes, some context observations had been inappropriately scheduled and were rescheduled as necessary. The hope was that by random selection of times, representation of specific academic areas would be approximately equal.

During the teacher orientation meetings, both *ThinkAbout* and control teachers were advised that the random observations would occur. They were

told that comparative data were to be collected with regard to the class process in which *ThinkAbout* would be expected to function. No information was given about the categories of discussion or the expected impact of *ThinkAbout* on other curriculum areas.

In the context observations, no distinction was made between comments on different programs, since the impact of the cluster was the primary focus for the field test. The data are first reported with respect to the entire sample of observations with *ThinkAbout* and control group classes combined. Then *ThinkAbout* and control group classes are broken out and reported separately. In addition, the results are divided by teacher orientation. The comparison of departmentalized and self-contained classrooms is reported only for *ThinkAbout* classes, not control group classes. Neither the student testing conditions nor grade level were considered in this assessment of generalized impact.

Results

A total of 667 separate observations were reported. The number of observations in each classroom varied from 1 to 15 with an average of 11 per class. Context observations began on November 26, the day of viewing the first warm-up program and continued through December 13, the end of the field test data collection. The average number of observations per day was 56. Each observation was 40 minutes in length, regardless of the classroom activities involved. Because observations were originally scheduled on the basis of teacher class schedules, most observations involved one major lesson or activity period. Roughly half of the observations were done in the morning (51.4%) and half in the afternoon (47.8%). Table V.16 shows the fairly even distribution of context observations when each design variable is considered.

Table V.16
Distribution of Context Observations
by Post Hoc & Design Variables

Variables Analyzed	Number of Observations	Percentage
City		
Kansas City	245	36.7
Knoxville	181	27.1
Syracuse	241	36.1
Teacher Orientation		
Complete	247	37.0
Minimal	203	30.4
Control Classes	217	32.5
Grade Level		
Fifth	294	44.1
Sixth 3	310	46.5
Grade not reported	63	9.4
Class Type (<u>post hoc</u>)		
Departmentalized	343	51.4
Self-Contained	324	48.6
TOTAL # of Observations	667	100.0

Topics of Lessons Observed

The overall distribution of lesson topics by curriculum areas reported (N=639) is shown in Table V.17 for *ThinkAbout* and control group classes combined. The total percentage is slightly over 100% because some observers observed two lessons by virtue of arriving at the end of one lesson and following through to some portion of the beginning of the second lesson.

As is apparent, the distribution of observations is heavily weighted towards language arts, reading and math lessons. The category "other" includes a wide variety of lessons: spelling test, discussion of Christmas

activities, planning of holiday bulletin board, art class, independent work in which children might have worked on any number of specific lessons, achievement tests, taping and listening to characterizations while practicing for a play, a career study project in which individuals watch and listen to film strips using earphones, etc.

Table V.17

Distribution of Context Observations by
Curriculum Area of Reported Lesson Topics

Curriculum Area	Adjusted Percentage*
Language arts	27.1
Reading	23.2
Math	27.9
Social studies	12.1
Science	6.4
Other	19.1

N=639

* Adjusted percentages total over 100% because of multiple lessons observed in one observation period.

When control group observations are compared to all *ThinkAbout* observations (complete and minimal teacher orientation groups combined), the distribution of observations by curriculum area parallels the overall distribution of percentages, but almost twice as many *ThinkAbout* observations were completed (*ThinkAbout* = 450; control = 217). Table V.18 contrasts lessons observed in *ThinkAbout* and control context observations. Math lessons were somewhat disproportionately represented, with a higher percentage in control group lessons than in *ThinkAbout* lessons. On the

other hand, *ThinkAbout* context observations included more social studies lessons than did control group context observations.

When the type of teacher orientation is considered, more minimal orientation observations occur in the areas of language arts and social studies. Greater numbers of science and other lessons are observed on complete orientation classes.

Table V.18

Percentages* of Lesson Topics Reported in
ThinkAbout and Control Classes by Curriculum Area

Curriculum Area	<i>ThinkAbout</i> (n=526)	Control (n=241)
Language arts	26.4	24.9
Reading	22.7	21.2
Math	24.4	31.3
Social studies	14.4	5.5
Science	5.6	7.4
Other	18.9	17.1
No response	4.4	3.7

* Percentages total over 100% because of multiple lessons observed in one observation period.

Discussion Observed on *ThinkAbout*-Related Topics

Whether general problem-solving and study skills are addressed in typical classroom lessons is relevant to the potential curriculum integration of the *ThinkAbout* programs. These context observations focus on three general areas: strategies for collecting information, general problem-solving, and personal study skills. Incidence of specific discussions about either *ThinkAbout* or *bread & butterflies* programs were also recorded.

Table V.19 demonstrates that in about half of the 667 *ThinkAbout* and control class observations problem-solving issues were discussed. Discussion of personal study skills was observed in almost one-third of the observations, and the narrower topic of strategies for collecting information was discussed in about one-quarter of the lessons observed. The possible "halo effect" of the field test is discussed below, but the fact that *ThinkAbout* programs were specifically mentioned in only 53 (7.9%) of the lessons verifies that a wide range of general discussion occurred in classrooms which could be structured and focused by experience with the *ThinkAbout* series.

Table V.19
Relevant Discussion Topics Observed in
All Context Observations

Topic	Percentage *
General Topics	
Strategies for collecting information	24.3
General problem-solving skills	48.7
Personal study skills	30.4
Specific Television Series	
<i>ThinkAbout</i>	7.9
<i>bread & butterflies</i>	1.2

N=667

* Percentages total 112.5%. Discussion topics
observed total 751 in 667 observations.

A second concern of the context observation was to ascertain the estimated amount of time devoted to issues related to the *ThinkAbout* project. The observer estimated the amount of time spent in the classroom discussing

each of the general topics. Table V.20 indicates the three general categories, the number of observations in which each problem-solving category was discussed, and a breakdown of the total sample of observations by amount of time devoted to discussion. The large number of observations in which no mention of any topic was made is also included.

Table V.20

General Topics Related to *ThinkAbout* Discussed
During Regular Classroom Activities
by Time Spent

Amount of Time Devoted to Discussion (min.)	Strategies for Collecting Information	General Problem Solving Skills	Personal Study Skills
Less than 5	97 (14.5)	106 (15.9)	112 (16.8)
6-10	35 (5.2)	91 (13.6)	53 (7.9)
11-15	15 (2.2)	46 (7.3)	21 (3.1)
Over 15	15 (2.2)	79 (11.8)	17 (2.5)
Blank	505 (75.7)	342 (51.3)	464 (69.6)
TOTAL Observations	667(100.0)	667(100.0)	667(100.0)

Most discussions of the three topics were brief (under 5 minutes). However, the broad ranging topic of general problem-solving was discussed both briefly and for substantially longer periods as well.

Table V.21 contrasts the discussion topics by *ThinkAbout* and control observations. In spite of the larger number of *ThinkAbout* observations, the percentages of general problem-solving topics were almost equal across the two groups. *ThinkAbout* was discussed substantially more than bread & butterflies in either group. The ten control classes in which *ThinkAbout* was discussed may have responded to the warm-up programs.

Table V.21

Contrast of Discussion Topics for
ThinkAbout and Control in Context Observations

	<i>ThinkAbout</i> No. (% of topics)	Control No. (% of topics)
General Topics		
Strategies for collecting information	112 (15.8)	50 (15.9)
General problem-solving skills	231 (32.6)	94 (29.9)
Personal study skills	145 (20.5)	58 (18.5)
Specific Television Series		
<i>ThinkAbout</i>	43 (6.1)	10 (3.2)
<i>bread & butterflies</i>	2 (0.3)	6 (1.9)
No Discussion of Any Area Above	103 (14.5)	55 (17.5)
Blank	<u>72 (10.2)</u>	<u>41 (13.1)</u>
TOTAL Topics Discussed	708(100.0)	314(100.0)

Teacher orientation condition had little relation to the type of lessons observed or to the topics of discussion. Numbers of general discussion of each of the three general topics was similar across orientation groups. The Collecting Information cluster was discussed in 6% of both complete and minimal orientation observations.

With respect to *ThinkAbout* classes only, Table V.22 below provides frequencies and percentages of the topics of discussion by curriculum area of the lesson. The entries in the first four columns represent the number (and percentages) of responses across the total number of observations in each curriculum area.

Table V.22

Distribution of Discussion Topics by
Curriculum Area for *ThinkAbout* Classes Only

Curriculum Area	Topic of Discussion				No. of Observations
	Collecting Information	Problem Solving	Study Skills	<i>ThinkAbout</i> Programs	
Language arts	29 (24.4)	48 (40.3)	42 (35.3)	12 (10.1)	119 (100.0)
Reading	40 (39.2)	61 (59.8)	43 (42.2)	6 (5.9)	102 (100.0)
Math	14 (12.7)	76 (69.1)	33 (30.0)	13 (11.8)	110 (100.0)
Social studies	19 (29.2)	33 (30.8)	29 (44.6)	9 (13.8)	65 (100.0)
Science	7 (28.0)	9 (36.0)	9 (36.0)	5 (20.0)	25 (100.0)
Other	22 (25.9)	32 (37.6)	17 (20.0)	8 (9.4)	85 (100.0)

N=506

The very broad area of problem solving was discussed across all curriculum areas with math the most frequent area of discussion. Collecting information was discussed most frequently in reading, while personal study skills were rather uniformly distributed across all areas considered. The *ThinkAbout* programs were most frequently discussed in science followed by reading, social studies, math, language arts, and "other," respectively.

The percentage of *ThinkAbout* discussion was highest in science lessons followed by reading, social studies, math, language arts, and "other" in that order.

Types of *ThinkAbout* Program Content Discussed. The *ThinkAbout* project staff was interested to know what use was made of several types of program content in the context observations. Table V.23 summarizes the relative frequency of four types of content. The educational message was given as an overall

or general class of discussion, it was also observed for content relating to each of the three programs. Clearly, the mnemonic ("What Do I Know? What Do I Need to Know?") is the most accessible educational content. The general topic of the cluster, collecting information, was the most frequently discussed aspect of the abstract educational message. The "other" category consisted of discussion of affective or moral messages perceived by the class as well as other issues not specified by the cluster objectives.

Table V.23

Program Content Used in
Seventy-Four Classroom Lessons

Content	No. of Observations (% of Lessons)
Mnemonic	48 (64.9)
Storyline	9 (12.2)
Educational Message (general)	31 (41.9)
Message - Collecting Information	32 (43.2)
Message - Information Needs	18 (24.3)
Message - Sources of Information	16 (21.6)
Other	10 (13.5)

No differences were apparent in use of overall types of program content when teacher orientation groups were compared. However, when the educational message category was subdivided into program foci, about twice as many complete orientation observations reported discussion of collecting information as did minimal orientation observations. A small difference on the other two goals (discussion of information needs and information sources) favored the complete orientation group.

Function of ThinkAbout Comments Table V.24 demonstrates the function of *ThinkAbout*-prompted comments. *ThinkAbout* might have come up in classroom activities by virtue of its being the focus of the activity, as an incidental comment, as part of the directions for an assignment, or because of the observers' presence. A category was included for those observations in which no comments were made about *ThinkAbout*.

Table V.24

Frequencies and Percentages
Reflecting the Function of Comments About
ThinkAbout Programs During Context Observations

Function	No. (X) of Total Observations
Incidental comment	38 (12.7)
Part of directions	24 (8.0)
Focus of activity	18 (6.0)
Observer's presence	5 (1.7)
No comments about <i>ThinkAbout</i>	214 (73.2)

N=299

Of the 299 tallied functions, the majority resulted in no discussion of *ThinkAbout* programs. Incidental comments and comments as part of the directions for a task were the most numerous functions of *ThinkAbout*-prompted remarks. In 18 (6.0%) of the classroom activities *ThinkAbout* was the focus of the activity. The observer's presence prompted very few comments.

In contrast to control group observations, *ThinkAbout* observations demonstrated more use of *ThinkAbout* as a deliberate part of the directions or focus of classroom activity. No difference was evident between the groups for the incidental use categories.

More of the complete orientation observations noted the *ThinkAbout* programs as the focus of activity during the observation period, but the absolute numbers are small in this case as in other comparisons reported here.

Departmentalized and Self-Contained Classroom Data

Context observations were analyzed according to departmentalized and self-contained classes only for *ThinkAbout* groups. The number of valid departmentalized context observations was 254, and the number of self-contained observations, 196. Table V.25 gives the distribution of context observations by subject area.

Table V.25
Distribution of *ThinkAbout* Context Observations
for Departmentalized and Self-Contained Classes
by Subject Area *

Subject	Departmentalized	Self-Contained
Language arts	77 (25.6)	42 (18.7)
Reading	37 (12.3)	64 (28.9)
Math	58 (19.3)	52 (23.1)
Social studies	50 (16.6)	15 (6.7)
Science	20 (6.6)	5 (2.2)
Other	47 (15.6)	38 (16.9)
No response	12 (4.0)	8 (3.6)
TOTAL	301(100.0)	225(100.1)

* The number of lessons observed exceeds the number of observation periods, since, in some cases, the 40 minute period spanned more than a single classroom lesson.

While not dramatic, some differences are evident in the frequency with which *ThinkAbout*-relevant issues were discussed by the two groups. Table V.26 displays the distribution of discussion about *ThinkAbout* programs by type of classroom and curriculum area.

Table V.26

Distribution of *ThinkAbout*-Related Discussion by
Type of Classroom and Curriculum Area

Subject	Departmentalized	Self-Contained
Language arts	10 (31.3)	2 (18.2)
Math	9 (28.1)	4 (36.4)
Social studies	8 (25.0)	1 (9.1)
Other lessons	6 (18.8)	2 (18.2)
Science	5 (15.6)	0 (0.0)
Reading	3 (9.4)	3 (27.2)
TOTAL	41(128.2)	10(109.1)

Departmentalized = 32 observations

Self-Contained = 11 observations

The distribution by discussion topic is displayed for departmentalized and self-contained classes in Table V.27. All three general topics relevant to use of the Collecting Information cluster were discussed more often in self-contained classes, but *ThinkAbout* programs were mentioned far more in departmentalized than in self-contained classes. Since control classes were eliminated from this post hoc analysis, discussion of *bread & butterflies* was understandably low.

No differences between departmentalized and self-contained observations occurred in the use of program content. As in the previous analyses, the

mnemonics were used most often, followed by the abstract educational message. The storylines were discussed least often when *ThinkAbout* was mentioned.

Table V.27

Distribution of Context Observations for
Departmentalized and Self-Contained Classes
by Discussion Topic *

Topic	Percentages	
	Departmentalized (n=254)	Self-Contained (n=196)
General Topics		
Strategies for collecting information	20.5	30.6
General problem-solving skills	48.4	55.1
Personal study skills	30.1	34.7
Specific Television Series		
<i>ThinkAbout</i>	12.6	5.6
<i>bread & butterflies</i>	0.4	0.5

* The number of discussion topics exceeds the number of observation periods. Percentages total over 100.0%.

Looking at only classes which viewed the *ThinkAbout* cluster and in which *ThinkAbout* was mentioned during regular classroom activities, one gets some indication of the ease of spontaneous generalized application. Most comments occurred in language arts, math and social studies. For departmentalized classes, comments about *ThinkAbout* occurred least often in reading even though reading represented a relatively large proportion of the total lessons observed in departmentalized classes. (See Table V.25.) Comments on *ThinkAbout* in science and social studies classes were higher than might be expected from the overall lesson distribution, suggesting

greater ease of application in these two areas than in the rest. Numbers are too small for generalization from self-contained class information.

Summary and Conclusions

Context observations took place during regular classroom activities, not during periods in which the field tested television programs were shown. A total of 667 observations occurred. The number of observations in each classroom varied from 1 to 15 with an average of 11 per class. The dates of observations began on November 28, the day of viewing the first warm-up program and continued through December 13, the end of the field test data collection. The average number of observations per day was 36.

Approximately three-quarters of the observations were divided among language arts, reading and math classes. In some classes, more than one lesson was observed. The distribution adequately taps many subject areas, providing an initial look at the immediate influence one cluster of *ThinkAbout* programs might have on regular classroom process.

Whether general problem-solving and study skills are addressed in typical classroom lessons is relevant to the potential curriculum integration of the *ThinkAbout* programs. These context observations focused on three general areas: strategies for collecting information, general problem-solving, and personal study skills.

In about half of the 667 *ThinkAbout* and control class observations problem-solving issues were discussed. Discussion of personal study skills was observed in almost one-third of the observations, and the narrower topic of strategies for collecting information was discussed in about one-quarter of the lessons observed. *ThinkAbout* programs were specifically mentioned in 7.9% of the observations. The Collecting Information cluster was discussed equally across complete and minimal teacher orientation classes.

Most discussions of either the three general topics or *ThinkAbout* were brief (5 minutes or less). The broad-ranging topic of general problem-solving was discussed for longer periods of time as well. Clearly, the mnemonic ("What Do I Know? What Do I Need to Know?") was the most accessible educational content. The general topic of the cluster, collecting information, was the most frequently discussed aspect of the abstracted form of the educational message.

The results described here should be qualified because of many factors which may limit the representativeness of the observations. While a "halo effect" might occur in a field test setting, other factors might work to limit the immediate impact of the *ThinkAbout* cluster. For example, discussion during regular classroom activities might not focus on the Collecting Information programs because teachers and students have already devoted a substantial amount of time to the programs in field test activities. Because the field test was not planned from the beginning of the school year, it constitutes a two and one-half week interruption around which it was necessary to maintain the on-going curriculum.

In addition, by selecting fairly random time periods, some entire context observation periods were given to classroom testing, achievement testing, Christmas program preparation, and, in one case, a field trip. If the context observation periods had been systematically scheduled, the percentages of observations in which either general topics or specific programs were topics of discussion might have dramatically increased. However, the focus of this evaluation was not to maximize the impression that the series had penetrated other classroom processes but to get information both about the amount of discussion and about how the series operates across a broad range of classroom context.

Without the benefit of long-term observation, perhaps in a goal-free evaluation mode, information is subject to qualification by virtue of the methods used. The amount of discussion of general topics relevant to the *ThinkAbout* series is encouraging and provides opportunity for *ThinkAbout* to be integrated into and to structure regular classroom activities. The apparent low level of generalization of specific television programs to the regular classroom context should be viewed in light of the teacher questionnaire results and the other classroom observation data on the kinds of lessons which teachers provide as program follow-up.

The observers' remarks are also indicative that the data reported here might be a lower-bound estimate of the impact of the Collecting Information cluster. These comments emphasized the types of activities which prevented a full view of the cluster's impact, their impressions of teacher enthusiasm, and potential points of applicability:

"Much individual or group activity, the reading teacher and teacher's aid are busy with groups and individuals, they do use problem-solving skills."

"Sometimes it is difficult 'uncomfortable' to sit near enough to the teacher and individual students to hear what is said. When it is convenient to listen closely both the teachers I have been observing spent most of the time on problem-solving skills and personal study skills."

"A parent teaches a small group every Tuesday... they do exercises that require logical thinking-deduction and induction-brinteasers."

"As all the classes at H.W. Smith-Syracuse, New York, this was individualized work. Because these grades are departmentalized and there is individual instruction, I feel our observations have not adequately represented the uses teachers do make of problem-solving techniques, nor is it an honest representation of their enthusiasm for the programs. Class had brainstormed ideas for bulletin board, they now begin to implement these ideas. Teacher explained what had been decided with other 5th grader and art teacher."

In conclusion, the potential for generalized impact is clearly evident. Initial, spontaneous use of the series is likely to employ the mnemonics more than any other aspects of content; the function of that use in the classroom is likely to be as incidental comments or part of the instructions for other tasks. Science is a likely curriculum area for generalized impact of the cluster. Although the two types of teacher orientation did not affect the frequency of discussion topics, the discussion of specific program and cluster objectives occurred more in complete orientation classes. Although the numbers are small, more complete orientation teachers used *ThinkAbout* programs as the focus of lessons in the context of regular classroom activity. These results have obvious implications for in-service training programs.

CHAPTER VI

TEACHER REACTIONS

For teachers to use the Collecting Information cluster as it was designed, they must perceive that the programs can help them teach the specific concepts for which each program was developed. In addition, they must be able to recognize the student objectives in each program and in the cluster as a whole.

To assess teacher perception of program and cluster objectives, four different teacher questionnaires were administered. Teachers in the two *ThinkAbout* field test conditions responded on individual questionnaires for each of the three cluster programs and on a fourth for the cluster as a unit. The questionnaires were designed to answer the following questions: What things do teachers perceive that each program could help them to teach? How effective do teachers perceive each program in addressing the student objectives? What is the effect of the two different teacher orientation conditions on teacher response to the programs and to the cluster?

The three program questionnaires were nearly identical. (See Appendix B.) On each one, three open-ended questions asked teachers to describe their perceptions of the major and minor teaching points and to comment on the program's appeal and comprehensibility to students and on its teachability.

Another question asked teachers to identify, from a list of related skills, those skills that they did use or might have used as the basis for a follow-up lesson. The list of skills (from Design Report 6) was identified by the *ThinkAbout* Executive Committee as applicable to the Collecting Information cluster. For each program the committee designated the skill or skills which were a part of the original design -- the "intended" skills. In addition, they identified "bonus" skills thought to be likely foci of teacher follow-up lessons.

The following tables are self-explanatory, showing teachers' responses to the various questions asked about each program. Tables VI.1 through VI.5 present the data for Program 1 in the cluster. Tables VI.6 through VI.10 are for Program 2, and Tables VI.11 through VI.15 are for Program 3.

WHAT DO I KNOW?
(Program 1)

Table VI.1

Teachers' Perceptions of the Main Thing
"What Do I Know?" Might Help Them Teach

Main Teaching Point	% of respondents ^a
The importance of planning when collecting information, stressing a systematic, step-wise approach to problem solving	69
Curriculum tie-ins (math, social studies, reading, language)	14
Maximizing use of available information sources	14
Categorizing/organizing information	9

N=35

^aPercentage totals more than 100% due to multiple answers from some respondents.

Table VI.2

Related Skills^a Recognized by Teachers
Which Might Have Been Used as Basis
for Follow-up Lesson for
"What Do I Know?"

Related Skill	% of Teachers
Δ Describing factually what was viewed or observed	82.1
Locating resource persons who can provide required information	74.4
* Using standard reference aids	69.2
Interviewing resource persons who can provide required information	56.4
Collecting information to answer specific questions by conducting a survey	56.4
Locating reference materials in a library or media center	53.8
Recognizing the criteria for authoritative sources	48.7
Using the parts of a book to preview a book or to locate information	46.2
Δ Measuring	28.2
Performing computations where money is involved	12.8
Rounding numbers to the appropriate place based on the problem situation	10.3
Reading and making a bar graph	7.7
Finding the arithmetic average	2.6
None of the above	2.6

N=39

Note: Average number of skills recognized = 5.5

^a See Design Report 6 for listing of related skills.

Δ Bonus: Related skill not included in original program design but "claimed" by *ThinkAbout* executive staff.

* Intended: The related skill included in original program design.

Table VI.3

Teachers' Perceptions of Teaching Points in
 "What Do I Know?" NOT in Related Skills List

Teaching Point	% of Respondents
Maximizing use of available information	30
Cooperative/group problem solving	10
Problem solving skills	10
The importance of planning when collecting information; stressing a systematic, stepwise approach to problem solving	10
Curriculum tie-ins (math, social studies, reading, language)	5
Miscellaneous	30

N=19

Table VI.4

Teachers' Ratings of Effectiveness of
 "What Do I Know?" in Addressing
 Student Objectives

Objective	Median Effectiveness Rating ^a
Determining information needs when solving a problem	1.3
The value of planning for an information collection activity	1.5
Determining information needs when pursuing an interest	1.7
Techniques for planning an information collection activity	2.2

N=39

^a Five-point scale was used for rating
 (1=very effective, 5=very ineffective)

Table VI.5

Teachers' Perceptions of Appeal, Comprehensibility
and Teachability of "What Do I Know?"^a

Response	% of respondents ^b
Program interesting, appealing	79
Program teachable (ties in with curriculum and is appropriate for target level students)	70
Expressed doubts about comprehensibility	18
Expressed doubts about program appeal	6
Expressed doubts about teachability	6

N=33

^a See Appendix G for comments in full

^b Percentage totals more than 100% due to multiple answers by some respondents

WHERE SHOULD I GO?
(Program 2)

Table VI.6

Teachers' Perceptions of the Main Thing
"Where Do I Go?" Might Help Them Teach

Main Teaching Point	% of Respondents ^a
Availability and use of information sources/ resource materials	88
Curriculum-related subjects (social studies, science, math, language)	13
Organizing information/materials	6

N=32

^aPercentage totals more than 100% due to multiple answers by some respondents

Table VI.7

Related Skills Recognized by Teachers
Which Might Have Been Used as Basis
for Follow-up Lesson for
"Where Do I Go?"

Related Skill	% of Teachers
* Locating reference materials in a library or media center	97.2
* Using standard reference aids	94.4
Δ Locating resource persons who can provide required information	91.7
Δ Interviewing resource persons who can provide required information	86.1
Δ Describing factually what was viewed or observed	86.1
Collecting information to answer specific questions by conducting a survey	63.9
Δ Recognizing the criteria for authoritative sources	61.1
Δ Performing computations where money is involved	61.1
Δ Using the parts of a book to preview a book or to locate information	50.0
Δ Rounding numbers to the appropriate place based on the problem	36.1
Measuring	8.3
Finding the arithmetic average	5.6
Reading and making a bar graph	2.8
None of the above	0

B-36

Note: Average number of skills recognized = 7.4.

Δ See Design Report 6 for listing of related skills.

* Intended: Related skill included in original program design.

Δ Bonus: Related skill not included in original program design but "claimed" by *ThinkAbout* executive staff.

Table VI.8

Teachers' Perceptions of Teaching Points in
 "Where Do I Go?" NOT in Related Skills List

Teaching Point	% of Respondents
Using a variety of approaches to problem solving	36
Systematic, thoughtful approach to problem solving	27
Telephone use	18
Cooperative problem solving	18

N=11

Table VI.9

Teachers' Ratings of Effectiveness of
 "Where Do I Go?" in Addressing
 Student Objectives

Objective	Median Effectiveness Rating ^a
The value of planning for an information collection activity in terms of types of sources and locating sources	1.5
The value of planning for an information collection activity in terms of selecting an appropriate source	1.6
Techniques for planning an information collection activity in terms of types of sources and locating sources	1.7
Techniques for planning an information collection activity in terms of selecting an appropriate source	1.9

N=36

^aFive-point scale was used for rating
 (1=very effective, 5=very ineffective)

Table VI.10

Teachers' Perceptions of Appeal, Comprehensibility
and Teachability of "Where Do I Go?"^a

Response	% of respondents ^b
Program interesting, appealing	91
Program teachable (appropriate to target student level and ties in with curriculum)	75
Expressed doubts about appeal	12
Expressed doubts about teachability	0
Expressed doubts about comprehensibility	0

N=33

^aSee Appendix G for comments in full.

^bPercentage totals more than 100% due to multiple answers by some respondents.

WHAT SHOULD I DO?
(Program 3)

Table VI.11

Teachers' Perceptions of the Main Thing
"What Should I Do?" Might Help Them Teach

Main Teaching Point	% of respondents
Guidelines for collecting information	41
Value of effective planning	28
Methods used for reporting data and making predictions	16
Curriculum tie-ins: (science, math, social sciences)	9
Problem solving skills	6

N=32

Table VI.12

Related Skills^a Recognized by Teachers
Which Might Have Been Used as Basis
for Follow-up Lesson for
"What Should I Do?"

Related Skill	% of Teachers
* Collecting information to answer specific questions by conducting a survey	86.1
Δ Locating resource persons who can provide required information	83.3
* Interviewing resource persons who can provide required information	75.0
Recognizing the criteria for authoritative sources	61.1
* Finding the arithmetic average	58.3
* Reading and making a bar graph	58.3
Describing factually what was viewed or observed	41.7
Using standard reference aids	36.1
Locating reference materials in a library or media center	33.3
Performing computations where money is involved	33.3
Rounding numbers to the appropriate place based on the problem situation	19.4
Using the parts of a book to preview a book or to locate information	8.3
Measuring	5.6
None of the above	0

N=36

Note: Average number of skills recognized = 6.0.

^a See Design Report 6 for listing of related skills.

* Intended: Related skill included in original program design.

Δ Bonus: Related skill not included in original program design but "claimed" by *ThinkAbout* executive staff.

Table VI.13

Teachers' Perceptions of Teaching Points in
 "What Should I Do?" NOT in Related Skills List

Teaching Point	% of respondents
Planning & organizing/systematic approach	40
Methods of collecting information	40
Cooperative problem solving	20

N=15

Table VI.14

Teachers' Rating of Effectiveness of
 "What Should I Do?" in Addressing
 Student Objective

Objective	Median Effectiveness Rating ^a
Variety of ways to collect information (such as interviews, questionnaires, secondary sources, etc.)	1.8

N=36

^aFive-point scale was used for rating
 (1=very effective, 5=very ineffective)

Table VI.15
Teachers' Perceptions of Appeal, Comprehensibility
and Teachability of "What Should I Do?"^a

Response	% of respondents ^b
Program interesting, appealing	55
Program teachable	30
Expressed doubts about program appeal	9
Expressed doubts about program teachability	6

N=33

^aSee Appendix G for comments in full.

^bPercentage totals more than 100% due to multiple answers by some respondents.

Cluster Questionnaire

After viewing the three programs, teachers responded to the cluster as a unit. Each teacher listed the main things the cluster could help them teach. Then on a five-point scale, they rated the effectiveness of the cluster in helping to teach the items named. Table VI.16 shows the listings, the proportion of teachers naming each item, and the average effectiveness rating of each item.

In Table VI.17 teachers indicated the curriculum area or areas to which they felt the cluster would be most applicable.

Table VI.18 shows how teachers rated the effectiveness of the cluster in addressing the student objectives (defined in the statement of cluster outcomes).

Table VI.16

Listing By Teachers of the Main Things the
Collecting Information Cluster
Might Help Them Teach

Item Named	% of Teachers who Named the Item (% of Teachers)	Median Effectiveness Rating ^a
Gathering information and finding sources	87 (34)	2.0
Planning before solving a problem	55 (22)	1.7
Identifying a problem	37 (15)	2.3
Specific subject area named, e.g., math, social studies	37 (14)	1.8
Using people as a resource for information	37 (14)	2.4
Using books as a resource for information	32 (12)	2.2
Assessing information	29 (11)	1.7
Cooperation	18 (7)	1.5
Organizing information	13 (5)	2.0
Making graphs or charts	5 (2)	2.5
Miscellaneous	18 (6)	1.5

N=38

Note: Median number of items named = 3.7.

^aIn rating each item's effectiveness, a 5-point scale was used
(1=very effective, 5=very ineffective)

Table VI.17

Curriculum Areas to Which the Collecting
Information Cluster Perceived by
Teachers to be Most Applicable

Curriculum Areas	% of Teachers
Language Arts	81.6
Social Studies	73.7
Science	55.3
Math	34.2
Other	18.4

N=38

Table VI.18

Rating by Teachers of Cluster's
Effectiveness in Addressing
Desirable Student Outcomes

Objective	Median Effectiveness Rating ^a
Awareness that planning is more useful than not planning	1.4
Consideration of a wide variety of sources for information gathering	1.7
The value of a systematic approach to collecting information	1.8
Awareness of the consequences of not planning	2.8

N=38

^a Five-point scale used for rating
(1=very effective, 5=very ineffective)

Table VI.19

Teachers' Descriptions of How They Might
Use the Collecting Information Cluster Again

Response	% of respondents
Curriculum tie-ins: Language arts, math social studies, science	40
Problem solving & research activities	26
Collecting information via reference materials/brainstorming	17
Appeal & teachability responses	17

N=35

Table VI.20

Teachers' Perceptions of Appeal, Comprehensibility,
and Teachability of the Collecting Information Cluster

Response	% of respondents
Program appealing, teachable, easy to comprehend	56
High appeal	32
Express questionable teachability	6
High appeal but requires too much teacher preparation	6

N=34

In two open-ended questions teachers were asked to describe how they
would use the cluster again if they had the opportunity and to comment on

its appeal, comprehensibility and teachability. These comments are transcribed in full in Appendix G. Tables VI.19 and VI.20 categorize these comments.

When the cluster questionnaire was analyzed with respect to the two teacher orientation conditions, no apparent or statistically significant differences were found. Similarly, no differences were noted for classroom organization or grade level conditions.

Conclusions

1. Teacher perceptions of the main teaching points for the individual programs and for the cluster as a unit were generally accurate with respect to the original design. Although the three programs deal with similar concepts, the emphasis in each is different. In describing the "main thing" each program might help them teach, teachers indicated appropriate distinctions among the programs.

"What Do I Know?" was seen primarily as teaching the importance of planning before collecting information or problem-solving (69% of respondents); "Where Do I Go?" was perceived as teaching the use of information sources (88%); while "What Should I Do?" was seen as focusing on techniques ("guidelines" and "methods") for collecting information (57%). "Where Do I Go?" was the most explicit in communicating its main teaching point.

For the cluster as a unit teachers identified the major teaching points as gathering information and finding sources (87% of respondents) and planning before problem-solving (55%).

2. In recognizing the related skills for each program, teachers generally were able to discriminate the "intended" and "bonus" skills identified by the Executive Committee from those not emphasized in the program. For all the programs, the designated skills were among the most

often identified as concepts which might be the basis of a follow-up lesson. For "What Do I Know?" the "intended" skill was identified by 69% of the respondents; for "Where Do I Go?" the two intended skills were identified by 97% and 94% respectively. For "What Should I Do?" the four intended skills were recognized by 86%, 75%, 58% respectively. "Where Do I Go?" was the most explicit in communicating to teachers the related skills included in the original design.

3. Teachers generally perceived a wide range of applications for the Collecting Information cluster. In response to both the open- and closed-ended questions, teachers indicated that potential lessons taught in conjunction with the programs would likely cross curriculum areas and include a variety of activities.

4. Teachers' ratings of program effectiveness in addressing the student outcomes were high for all three programs and for the cluster. On the five-point scale (1=very effective to 5=very ineffective) median effectiveness ratings ranged from 1.3 to 2.8. Only two of the 14 objectives were rated below 2.

On the cluster questionnaire, each teacher generated a list of the main teaching points and then rated the cluster's effectiveness in dealing with those concepts. These ratings were also very high, ranging from 1.5 to 2.5.

5. Overall teacher responses to each of the three programs and to the cluster as a unit was generally very positive. For the most part they perceived the stories to be appealing and relevant to the interests of fifth and sixth graders. In addition, the content was seen to be comprehensible by those students. Teachers found the cluster teachable, indicating that the programs lent themselves naturally to follow-up.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Methodology

The Collecting Information cluster was field tested from November 29 through December 12, 1978. Sixty 5th and 6th grade classes in Kansas City, Missouri; Syracuse, New York; and Knoxville, Tennessee participated. The field test was conducted to examine the use of the cluster and its impact on teachers, students, and the classroom process.

The field test design included several variables: teacher orientation, student testing condition, and grade level. The teacher orientation involved two conditions. In the complete orientation condition, teachers participated in a workshop to learn about the content and goals of the SEL project and the Collecting Information cluster. They discussed ways of using *ThinkAbout* in the classroom and received complete teacher's guide materials for the cluster. In the minimal orientation condition, teachers received limited information about the SEL project and the cluster. They received only a one-page summary of the programs their students would watch.

A control group was established in which students saw *bread & butterflies* programs. Control condition teachers received teacher's guide materials for the *bread & butterflies* series and a brief orientation to the field test.

Control classes and the two groups of *ThinkAbout* classes were compared with respect to the kinds of lessons taught in conjunction with the programs and with respect to student learning outcomes. Control classes received testing and observation treatment identical to that received by the *ThinkAbout* classes.

To collect data on student learning outcomes, written pretests and posttests were administered, as well as individual student interviews.

Classroom observation occurred during the viewing of the programs and at other specified times during the school day. Data on classroom process were gathered by classroom observers, who documented the nature of pre-viewing and follow-up lessons in narrative and summary form. In addition, to assess the extent of carry-over of the programs into other lessons throughout the school day, observers visited classes to record information about lessons taught in the context of regular classroom process.

Finally, *ThinkAbout* teachers reacted to the programs and to the cluster as a unit on a set of teacher questionnaires. They evaluated the effectiveness of the programs and provided information about the clarity and applicability of the educational content.

Conclusions

Before discussing the findings of this evaluation, the field test of the Collecting Information cluster must be placed in perspective. This effort goes beyond the normal formative evaluations associated with AIT's projects. It moves in the direction of summative evaluation, although the study wasn't designed to reach that end of the evaluation continuum. This field test is an in-depth study of the impact of a cluster of *ThinkAbout* lessons, not the entire series. The evaluation examined classroom interaction that occurred when the programs were used; it looked at teachers'

perceptions of program content; it assessed what changes might take place in students who have experienced these lessons.

Realistically, the Collecting Information cluster is a very small educational treatment. Direct instruction associated with the three programs was approximately one-and-one-half hours on the average. The cluster is but five percent of the *ThinkAbout* series. Generalization from the results of this field test must be done with caution. The interactive and cumulative impact of successive clusters seen across an academic year cannot be approximated in a two-week field test.

The results and conclusions are as follows:

Student Outcomes

1. Students instructed by the Collecting Information cluster increased their knowledge of techniques for collecting information. Those techniques—questionnaires, surveys, taking notes, making charts and graphs—were specifically emphasized in the programs. Fifth and sixth graders are already familiar with many conventional sources of information. (See Table IV.1.)
2. Students instructed with the Collecting Information cluster were more likely to list thinking and planning activities as the first thing to do when beginning a collecting information task. Fifth and sixth graders are already aware of the value of planning, and they can project the consequences of not planning in familiar situations. (See Table IV.3.)
3. Changes in "cognitive structure" for concrete activities associated with collecting information occurred over time when relevant *ThinkAbout* instruction was provided. Prior to instruction, the representation of "cognitive structure" was loosely organized. After instruction, new

- clusters of similar activities occurred and distinctions between different activities were sharpened. (See Figures IV.1 and IV.2.)
4. Fifth and sixth graders generally are not able to communicate about collecting information as an abstract process. This result was consistent across different forms of instrumentation.
 5. On the instruments used, there were no differences found related to classroom organization patterns and to teacher orientation conditions.

Classroom Process

1. The acceptability criteria for program follow-up lessons were adequately met. The requisite 15-minute follow-up lesson was closely approximated for all three programs; the average length of lesson was 12 to 14 minutes. The requirement that follow-up include review and discussion of program events was met by 96% of the lessons. The requirement that specified objectives or related skills be the focus of the follow-up was met by 84% of the lessons. (See Tables V.3, V.4, and V.5.)
2. Teachers with the complete teacher's guide tended to present more "good" follow-up lessons and fewer "inadequate" lessons; teachers with a limited teachers guide presented fewer "good" lessons and more "inadequate" ones. (See Table V.15.)
3. *ThinkAbout*-related discussions, e.g., problem-solving, study skills and collecting information, occur in many classrooms as part of the on-going classroom process, and there is a great potential for this project to structure those discussions. (See Table V.19.)
4. The relative frequency of teachers' spontaneous application of cluster content seems to be related to the curriculum area of the lesson. (See Table V.22.)

5. The mnemonic is the most accessible part of the program for spontaneous application in a variety of subject areas during regular classroom activities. (See Table V.23.)

Teacher Reaction

1. Teachers were able to make appropriate distinctions among the programs in terms of the conceptual emphases of each program. (See Tables VI.1, VI.6, and VI.11.)
2. The related skills designated for each program were consistently identified as possible bases for follow-up lessons, in contrast to those skills which were not emphasized. (See Tables VI.2, VI.7, and VI.12.)
3. Teachers indicated that potential lessons taught in conjunction with the programs would cut across curriculum areas and include a wide range of activities. (See Table VI.17 and Appendix F, pp. F19-F22.)
4. Teachers rated the programs as effective in addressing student outcomes. (See Tables VI.4, VI.9, and VI.14.)
5. Teachers perceived the stories to be appealing and relevant to the interests of 5th and 6th graders. (See Appendix F.)

Methodological

1. "Context" observations focused primarily on classroom discussion. Consequently, some examples of impact were not recorded, e.g., individualized instruction, small-group interaction, bulletin boards, etc.
2. "Warm-up" programs were intended to provide a frame-of-reference for students, so that all classes would be equivalent at baseline measurement. They inadvertently instructed control group students in some of the concepts also emphasized in the Collecting Information cluster. As a result the baseline scores of all students on the student outcomes were likely raised, producing ceiling effects and minimizing pretest posttest change.

3. A large sample of departmentalized classes was not anticipated; they resulted in procedural changes and in an additional dimension for the reporting of data. Because the two groups (departmentalized and self-contained classes) were not balanced in number, conclusions about class-organization were often difficult to make.
4. Examining "cognitive structure" and the use of multidimensional scaling techniques seem to be productive directions for future research.
5. Performance tests and simulated problem-solving tasks are likely to be more successful than written measures in assessing the impact on students of program clusters and the entire series.

APPENDIX A
TEACHER'S GUIDE MATERIALS
USED IN FIELD TEST

Lesson One: What Do I Know?
Lesson Two: Where Should I Go?
Lesson Three: What Should I Do?

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COLLECTING INFORMATION

Cluster Goal

This cluster will help students determine information needs relevant to the solution of a problem, select appropriate sources of information, and use various strategies to collect information.

About Collecting Information

Collecting information is a continuous part of students' lives, both inside and outside the classroom. Whether developing an English theme, solving a math problem, writing a report, or deciding how to fix a broken bicycle, the student needs appropriate information. Many students, unfortunately, seek out information without clarifying their purpose, without recognizing what information they really need, and without determining where the information is likely to be found.

This cluster offers some useful questions to help students in the information collecting process:

"What Do I Know? What Do I Need To Know?" These questions help students establish a definite purpose before seeking their information.

"Where Should I Go?" helps students consider what sources of information would be appropriate for their purpose.

"What Should I Do?" helps students consider what strategies, such as observing, interviewing, or experimenting, would be appropriate for their purpose.

Throughout the cluster, students should be involved in a variety of situations that require the collecting of information relevant to a specific purpose, both inside and outside the classroom. They should be encouraged to see the benefits of asking "What Do I Know? What Do I Need To Know?" before beginning their information search.

Students should also be encouraged to expand the range of sources and strategies they use for collecting information. For example, suppose students need to collect information on the history of their school. They could schedule taped interviews with teachers, principals, former students and custodians; they could locate various documents from a local library or historical society and take notes from what they read; and they could create and distribute

questionnaires to local residents who live near the school. Overall, students should be encouraged to see the value of planning an information collecting activity before diving into the activity and they should be given as much practice as possible in systematically planning and conducting an information collecting activity.

LESSON ONE: WHAT DO I KNOW?

Teaching Points

1. It is important to clarify one's purpose before seeking information.
2. One should ask, "What do I know? What do I need to know?"

Skills Reviewed In This Program

Primary Skill: Using standard reference aids.

Other Skills Included: Summarizing information in note form; measuring with metric units.

Vocabulary

The following words are used in the program and may be used for vocabulary lessons:

announcements
centimetre
hovered
identification

index
kilometre
leads

shelter
sprocket
UFO

Before the Program

Read the following situation to the class: Jackie came home from a friend's house one day to find half of her newly baked cake gone -- the one she was to take to a party that evening. She questioned her brothers and sisters, but they all claimed their innocence. Ted said he'd been swimming and showed her his wet trunks. Mary said she'd been shopping, and showed Jackie her new clothes and sales slip. Charlie said he'd been to the library, and held up the book he said he checked out. And Roxie said she'd watched television all day and began giving lengthy descriptions of the shows she'd seen.

After further investigation, Jackie found the guilty party. Without finding a trace of cake, or talking to anyone else, she proved Charlie's story was inaccurate and prompted his "confession of guilt."

Ask students: How did Jackie solve the mystery? What did she know about the "suspect"? What did she need to know?

Answer: Although Charlie claimed to have checked out a book from the library that day, it was due in only four days. The local library loans books for a week at a time. Charlie admitted eating the cake, and helped Jackie quickly bake another one.

Program Summary

"What do I know? What do I need to know?" is applied in two different problem-solving segments. In the first, Brady finds a lost pup and looks in the newspaper to see if it has been reported missing. He also checks unsuccessfully with the animal shelter and police. Rita, the girl who lost the dog, checks unsuccessfully with the police and animal shelter. Eventually a lost and found report on the radio brings the two together.

In the second segment (which continues in Lesson 2), two youths who saw a UFO have the problem of proving it to their families and friends. They list all they know and begin to decide what they need to know.

After the Program

Ask students to recall what the youths in the program knew and needed to know to solve their problems. Then, apply "What do I know? What do I need to know?" to a present classroom problem. For example, if some plants in the classroom are not doing too well, list what is known on the chalkboard (possibly the leaves are turning yellow, the plants are seldom watered, and bugs have been seen in the area), and then ask "What do we need to know?"

LESSON TWO: WHERE SHOULD I GO?

Teaching Points

1. When selecting information sources, one should consider as many sources as possible.
2. The most appropriate sources should be selected on the basis of needs and constraints.

Skills Reviewed In This Program

Primary Skills: Locating print reference materials in a library; using standard reference aids.

Other Skills Included: Interviewing; performing computations with money.

Vocabulary

The following words are used in the program and may be used for vocabulary lessons:

cube	long distance telephone call	sensations
dial direct	microfilm	skimmed
hologram	operator	sources
laser beams	scanned	UFOlogy

Note: Two publications the program refers to are:

The Encyclopedia of Associations, published by Gale Research, Detroit, Michigan (1st ed., 1956), is revised every few years and supplemented at regular intervals.

The Final Report of the Scientific Study of Unidentified Flying Objects, commonly known as the Condon report or Project Bluebook report, was contracted and reported by the University of Colorado (Edward U. Condon, scientific director), and published by Dutton (New York, 1969).

Before the Program

Review the second segment of the previous program. Ask, how did Pete and Marty attempt to solve their problem? What did they know? What did they need to know? Then, ask students to predict where Pete and Marty will go to obtain their information. Do you think they will be able to prove what they saw?

Program Summary

After Pete and Marty determine to prove that they saw a UFO, one follows up local clues (tracing the strange barking they heard, checking the local newspaper, and finding out if anyone else saw

the object), and the other goes to a library and attends a meeting to gain additional information on UFO's. Through their combined efforts they determine that the UFO was part of an experiment from nearby test laboratory.

After the Program

Have students recall the various sources of information that were used in this program and the previous one. Then ask: What other sources might they have used?

Note: A hologram is a three-dimensional picture. You may wish to have students research this term.

Teaching Points

1. After appropriate sources are selected, choose the best ways to gather and record the information (such as conducting surveys, taping interviews, or taking notes).
2. Plan carefully before actually gathering information.

Skills Reviewed In This Program

Primary Skills: Reading and making a bar graph; finding the arithmetic average; conducting a survey; interviewing.

Other Skills Included: Describing data; making predictions from data; participating in a discussion.

Vocabulary

The following words are used in the program and may be used for vocabulary lessons:

appointment	questionnaire
criteria	sample survey
interview	trial basis
"mechanically inclined"	

Before the Program

Review the three questions from the previous two programs: What do

I know? What do I need to know? Where should I go? Then ask: After determining your information needs, and considering and selecting various sources, what should be done next? Explain that this program focuses on carefully gathering and recording information. The key question is: "What should I do?"

Program Summary

When the school dietitian challenges three complaining students to plan a more popular menu themselves, they think it will be easy. But finding out what people like and keeping the meal well-balanced and reasonable in cost require some planning and research. A survey of students, an examination of cafeteria records, and a taped interview with the dietitian help students to a winning combination.

After the Program

Retrace the steps to answer the question at the end of the program: "How did you come up with that choice?" Direct students' answers to include the previous steps of information collecting, covered in the first two programs ("What do I know? Need to know? Where should I go?") Then have students decide on a way to determine the class's favorite meal, one not now on the school lunch menu. (Note: This can be extended as part of a cluster activity; refer to "Collecting Information on School Lunches.")

INFORMATION COLLECTING THROUGHOUT HISTORY

Emphasize to students that information collecting is part of everyday life. This has been true throughout history. People have continually asked, in many different ways, "What do we know? What do we need to know?" Of course, some situations are more obvious than others. For example:

Newspaper work is commonly known as an information collecting concern. JOSEPH PULITZER (1847-1911), for whom the "Pulitzer Prize" was named, was an important information collector who fought government corruption with his newspaper.

Scientists are also known for their collecting of information. NICHOLAS COPERNICUS (1473-1543), for example, laid the foundation of modern astronomy by observing motions of various planets and concluding that the earth revolved around the sun. This information is considered one of the most important scientific contributions in history. 164

MARIE CURIE (1867-1934), co-discoverer of radium and a Nobel Prize recipient, spent the greater part of her life doing research that significantly contributed to the development of modern physics.

Students may be surprised to learn that before the use of fingerprints, police collected information on suspects by measuring their heads, bodies, and limbs. This system, later discredited, was developed by ALPHONSE BERTILLON (1853-1914), a Paris policeman.

The need for information is essential in police and detective work. ALLAN PINKERTON (1817-1889) opened an investigative business and became the first "private eye."

But not all information collecting is so obvious. HARRIET TUBMAN (1820-1913), for example, was a slave who escaped and later helped others to freedom. She needed information to make sure she was not caught.

CHRISTOPHER COLUMBUS (1451-1506) also needed information before starting out on his famous voyages.

You may wish to list the above-named persons, as well as others, and ask students to research how these famous information collectors went about their work. Students should answer these questions: "What did they know? What did they need to know? Where did they go? What did they do?"

A bulletin board could also be created showing some historical information collectors and their contributions.

CLUSTER ACTIVITIES

COLLECTING INFORMATION ON SCHOOL LUNCHES (Mathematics, Science)

Ask students to name their favorite lunch, one not now on the school menu. Compile results to find the class favorite. Then ask students if they think their choices would also be the favorite of other students in the school and use "What do I know? What do I need to know? Where should I go? What should I do?" to find out.

The following tasks are recommended for the completion of this activity:

DECIDE what information is needed -- complete lunches or main courses only.

DECIDE who to survey -- the entire school or one grade level.

BRAINSTORM ways to collect this information, such as:
INTERVIEWING students, passing out QUESTIONNAIRES, etc.

CREATE A GRAPH showing the results of your survey.
(Students may wish to graph the results by grade level
and by the school as a whole.)

CREATE a lunch based on the results of the survey.
(Make sure the lunch also corresponds to the Basic Four
Food Group requirements.)

INTERVIEW the school dietitian to see if the lunch
could be served.

COLLECTING INFORMATION FOR A HANDBOOK FOR NEW STUDENTS (Language Arts)

Enrolling in a new school can be a difficult experience for some students. One way to make the adjustment easier is to provide students with a "New Student Handbook."

Ask students what information a student new to your school would need in a handbook. Have them recall their first few days in your classroom. What did they know? Need to know?

Next distribute the following tasks to individual students or student groups:

DETERMINE what information is needed on topics such as subject areas, class schedule, recess, hall passes, lunch, and after-school activities. Confirm the topics by talking to students new to your school since the beginning of the year.

IDENTIFY possible sources of information. For example, for information on music class, the music teacher would be the best source; for school rules, the principal or a hand-out for students.

COLLECT the information: INTERVIEW resource persons and LOCATE necessary printed material. TAKE NOTES on the information collected.

SUMMARIZE the information in paragraph form.

CREATE a "New Student Handbook," including all relevant information collected.

DISTRIBUTE the handbook to new students through the principal's office or individual classrooms.

COLLECTING INFORMATION ON COMMUNITY RESOURCES (Social Studies, Language Arts)

One important community resource is the aid available in case of a

serious accident or injury. To act calmly and correctly, one should know about the services and how to reach them. Guide the students through the information collection process by examining the special services for medical emergencies in the community.

SURVEY the class the find out how individual students respond to an emergency and to answer the question: What do I know?

LIST INFORMATION that answers: What do I need to know? The list may include the location of clinics and hospitals, emergency room rules, auxiliary services such as medics, and appropriate first-aid techniques.

USE REFERENCE MATERIALS that answer: Where should I go? Check the telephone directory. Gather books on first-aid. Contact the local health association or hospital.

COLLECT INFORMATION through interviews, observations, brochures, and note-taking to complete the process with the final question: What should I do?

CREATE a map of the community showing the location of clinics, hospitals, fire stations, and other important services.

WRITE a class survival booklet summarizing findings and listing important telephone numbers, information to give in an emergency, and common first-aid techniques.

COLLECTING INFORMATION ON LOCAL NEWS SERVICES (Social Studies, Language Arts)

Discuss and compare various ways that news events are reported to your community, such as radio, TV, and newspapers. Then, using "What do I know? What do I need to know? Where should I go? What should I do?" as a guide, ask students to find out how a story becomes a news item. (Students could also find out how human interest stories are chosen for various newspaper columns.) Then you may ask students to:

DIVIDE INTO GROUPS and collect information on different sources of news, such as radio, TV, large circulation newspapers, and community newspapers.

PRESENT the information to the class in a way that reflects the topic. For example, students researching radio news could tape record a radio show; students researching newspapers could create a newspaper.

There are other possible directions for this activity. The following tasks can be distributed to individual students or student groups:

1. CREATE your own classroom news-gathering team to report school and community happenings.
2. COMPARE the same news item as reported by two or more different sources. How are the stories similar? Different? DISCUSS why the same story might be reported differently.
3. USE REFERENCE MATERIALS to find out how news is collected and reported in various foreign countries.
4. DISCUSS what would happen if no news were collected or reported for one week.

Other Activity Suggestions

The grid below could be used for a number of other information collecting activities.

What do I know?	What do I need to know?	Where should I go?	What should I do?
---	---	---	---
---	---	---	---

For example, ask students to find:

The age of a fossil...

The origin of a foreign coin or stamp...

Why your school is named as it is...

To what extent solar energy is used in your community...

How a president or prime minister is elected...

How a book is published...

What information is important for an upcoming test...

Requirements for passing a particular physical fitness test...

CLUSTER: COLLECTING INFORMATION

Cluster Goal

This cluster will help students determine information needs relevant to the solution of a problem, select appropriate sources of information, and use various strategies to collect information.

About Collecting Information

Collecting information is a continuous part of students' lives, both inside and outside the classroom. Whether developing an English theme, solving a math problem, writing a report, or deciding how to fix a broken bicycle, the need for appropriate information is highly important. Many students, unfortunately, seek out information without clarifying their purpose, without recognizing what information they really need, and without determining where the information is likely to be found.

This cluster offers some useful questions to help students in the information collecting process.

LESSON ONE: WHAT DO I KNOW?

Teaching Points

1. It is important to clarify one's purpose before seeking information.
2. One should ask, "What do I know? What do I need to know?"

Program Summary

"What do I know? What do I need to know?" is applied in two different problem solving segments. In the first, Brady finds a lost pup and checks unsuccessfully with the newspaper, animal shelter, and police to see if it has been reported missing. The girl who lost it checks unsuccessfully with the police and animal shelter. Eventually a lost and found report on the radio brings the two together.

In the second segment (which continues in Lesson 2), two youths who saw a UFO have the problem of proving it to their families and friends. They list all they know and begin to decide what they need to know.

LESSON TWO: WHERE SHOULD I GO?

Teaching Points

1. It is important to consider as many sources of information as possible.
2. The most appropriate source should then be selected on the basis of needs and constraints.

Program Summary

After Pete and Marty determine to prove that they saw a UFO, one follows up on local clues (tracing the strange barking they heard, checking the local newspaper, and finding out if anyone else saw the object), and the other goes to a library and attends a meeting to gain additional information on UFO's. Through their combined efforts they determine that the UFO was part of an experiment from a nearby test laboratory.

LESSON THREE: WHAT SHOULD I DO?

Teaching Points

1. The way in which information is collected is an important consideration.
2. Various ways of collecting and keeping track of information should be considered.

Program Summary

When the school dietitian challenges three complaining students to plan a more popular menu themselves, they think it will be easy. But finding out what people like, and keeping the meal well-balanced and reasonable in cost, require some planning and research. A survey of students, an examination of cafeteria records, and a taped interview with the dietitian help students to a winning combination.

GENERATING ALTERNATIVES

Lesson One: When You're Stuck . . .

Lesson Two: Brainstorming

Lesson Three: If This . . . Then What?

Cluster Goal

This cluster will help students generate as many alternatives to a problem as possible and think about the probable consequences of each alternative.

About Generating Alternatives

Generating alternatives is presented as one of the first steps in the problem-solving process because students often do not generate alternatives to problems.

They are not typically given choices or encouraged to look for alternatives. They often fix on only one idea and follow it through regardless of other possibilities or the consequences of the idea. But, students can and do generate alternatives if they realize the usefulness, are shown how, and are encouraged to do so. They need to be aware 1) that in any problem situation there may be more than one

approach to a solution; 2) that it is important to generate as many alternatives as possible; 3) that since each alternative will have consequences, it is necessary to predict those consequences in order to evaluate the alternatives and to select one.

What is involved in learning to generate alternatives? When we get stuck on one idea and need to free up our thinking, we can use techniques that break our habitual thinking patterns. A useful technique for generating alternatives in a group is a procedure called brainstorming. And, a useful way to mentally check on and predict outcomes is to think through the question: "If this occurs, then what will happen?" The programs in this cluster demonstrate each technique and serve as a springboard for encouraging students to use those techniques in a wide variety of situations, both in and out of school.

LESSON ONE

When You're Stuck

TEACHING POINTS

1. Thinking often becomes habitual and alternatives are not considered.
2. There are several techniques for generating alternatives:
 - a. Try examining the assumptions, as a scientist does when seeking to verify an experiment.
 - b. Try mentally picturing a problem or drawing a diagram, as an architect does with a design sketch.
 - c. Try changing perspective entirely by coming at the problem from a different point of view.
3. If nothing seems to work, keep trying different approaches.

Before the Program

Read this mini brain teaser to the class:

A boy on a bicycle arrived at a spot where three roads met. He looked for the sign that would tell him which road to take to the town of his destination. He saw that the sign had fallen into some bushes. Picking the sign up, he thought briefly, and then put it in its correct position. How did he know the correct position?

(Answer: The sign had three pointers. He set it up so the pointer with the name of the town he had just come from pointed along the road from that town.)

After the class has tried to answer the question, explain that often we get stuck on a problem and need ways to free up our thinking.

Ask students to look for techniques in the program that help people look at problems in new and different ways, even though it does not always seem possible.

Program Summary

What do magic tricks have in common with problems? A lot according to the Great Renaida, who uses magic

to show a variety of ways to approach problems. To figure out a magic trick or a difficult problem, we need to think of many different approaches. Three approaches are depicted as the magician shows us how Sir Alexander Fleming discovered penicillin by questioning assumptions, how a young girl moved her prize possessions into a smaller room in a new house by diagramming the problem, and how an athlete made his handicap work for him instead of against him by changing his perspective.

APPLIED SKILLS INCLUDE: Reading and making scale drawings; using visual aids during presentations.

After the Program

Review the three techniques for generating alternatives presented in the program. Ask the students for other ways to unlock thinking, such as sleeping on the problem. Ask the students how they would use the three techniques from the program to solve the final magic trick.

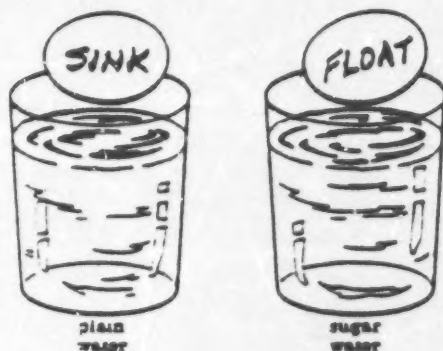
What was the discovery made by Archimedes, the Greek mathematician, that the magician hinted at?

(NOTE: Archimedes discovered that water exerts an upward force called buoyancy, that works against the downward force of gravity. Water with salt or sugar added has greater buoyancy and can push up with greater force.)

Some students may wish to perform the "magic trick" in class or later at home. Here are the directions:

2 237 ml glasses water*
60 ml sugar
2 uncooked eggs
Laundry marking pencil

Fill the glasses with water to about two centimeters below the top. Dissolve sixty milliliters of sugar in one glass. Mark one egg "sink" and the other "float." Put the egg marked "sink" in the glass with plain water and the "float" egg in the sugar water.



Some classroom amateur magicians may wish to plan a magic show in which the class uses the techniques in the program to generate alternatives for discovering the "secret" of the tricks.

*The permanent guide will include a conversion table for teachers using standard measurement.

LESSON TWO

Brainstorming

TEACHING POINTS

1. Brainstorming is a technique for generating as many ideas as possible, organizing the ideas into useful categories, and selecting the best alternative.
2. The rules for the idea generating session include:
 - a. Build on each other's ideas.
 - b. No comments.
 - c. Have a leader.
 - d. Write it down.

Before the Program

Put the word "brainstorming" on the chalkboard. Ask the class what the term means to them. How would they define it? Notice the two words that make up the complete word. Why would "brain" and "storming" be combined into one word? What do they think they would be doing if they were brainstorming a problem? Encourage as many responses as possible and record them on the chalkboard.

Explain that one way to approach problems is to do brainstorming, which is similar to what the class did in naming as many meanings for brainstorming as possible. Ask the students to look for the way brainstorming is used in the program, to notice the steps involved and to think of other ways it would be useful for them.

Program Summary

Three winners in a school poster contest are invited to help an advertising agency brainstorm ideas for a water safety commercial. The advertising executive who acts as group leader explains that brainstorming is a technique they use to get their thinking going. The rules during the initial session include thinking up as many ideas as possible, even crazy ones, and not commenting about other people or their ideas. The ideas that are generated are organized into categories later. In a final session, the group evaluates the ideas and selects the best alternatives. When this brainstorming technique results in an effective commercial five weeks later, the students realize how useful the procedure can be for their own projects.

APPLIED SKILLS INCLUDE: Using an appropriate communication style for a specific purpose and audience; participating in a discussion; using appropriate listening behaviors; using visual aids for presentations.

After the Program

Review the steps in brainstorming with the class.

172 Have the class brainstorm their own commercial on

water safety. Use the procedure presented in the program. Choose a few students from the class, and acting as the leader yourself, demonstrate the procedure. Remember it is crucial to keep evaluation separate from the idea generation session.

Brainstorm about brainstorming. Present this problem to a demonstration group: On what problems or projects would brainstorming be a useful technique for the class to use? Again act as leader yourself. After brainstorming, organize and evaluate the ideas. Some of these may be suitable for follow-up as classroom projects. If so, have students brainstorm how they could go about conducting their project.

LESSON THREE

If This . . . Then What?

TEACHING POINTS

The way to evaluate alternatives is to think about the consequences of each.

Before the Program

Use the technique suggested by the title to help the students predict a variety of outcomes. The following are suggestions:

If This . . . the alarm clock doesn't go off in the morning . . . Then What . . . ?

TEACHING HINTS FOR THE CLUSTER

Problem-solving, both school and non-school related, often involves searching for information. Generating alternatives for locating information by using techniques presented in the programs is an initial step in an information search. Therefore, if students find using reference materials and locating information a difficult task, it is useful to take them through a demonstration "search" and to encourage them to use the procedure often.

Information Search

The "Hey Wait! Think, See, So?" cluster showed Alexander Graham Bell inventing the telephone. The patent issued to Bell for the telephone is often called the most valuable patent ever issued. Have the class learn more about the telephone, how it works, and why its patent is the most valuable.

BRAINSTORM in small groups or individually the possible topics (such as definition of telephone, definition of patent, Alexander Graham Bell, sound waves and vibration, musi-

If This . . . Mr. Bell did not invent the telephone . . . Then What . . . ?

If This . . . you miss the bus home after school . . . Then What . . . ?

If This . . . you forgot your lunch money . . . Then What . . . ?

If This . . . there will be no daylight for six months . . . Then What . . . ?

Encourage as many alternative outcomes as possible for whichever situations are selected.

Program Summary

A pop singer gets ideas from the audience for verses to a song in which the refrain goes: "Thinkabout it. Ask yourself/If I do this then what?/I went without a thinkabout/ And soon ran out of luck." Three problem situations are suggested as subjects: (1) a student locked in the auditorium after school hours; (2) a badly damaged canoe on a river trip; and (3) a town's water shortage. As verses take shape, the singer and audience (and camera) imagine the possible consequences of the alternatives for each problem.

APPLIED SKILLS INCLUDE: Reading and making maps; using visual aids in presentations; making predictions from data.

After the Program

Ask the students what alternatives they can think of for conserving water. Draw the "idea tree" from the program on the chalkboard. What would be the consequences of each alternative? The best alternatives will have several branches on the idea tree.

cal instruments, tuning forks, human voice, electromagnets, communication, telecommunication, telephone design).

LIST the possible sources the students would search to locate information on the possible topics (such as dictionary, encyclopedia, science books, bibliographies, Bell Telephone Company).

Do the INFORMATION SEARCH. Point out that some sources will lead students to check on other topics and sources. For example, Edison made a contribution to the final invention of the telephone. Possible topics and sources might need to be checked for Edison's contribution.

Explain that this procedure for generating alternatives can be used with any reference material. For example, if the students find using the dictionary to look up the spelling of a word is a difficult task, suggest that they try generating alternatives. Have them think of as many alternate spellings of a word as possible before going to the dictionary. Select the most probable spelling from the list and begin the dictionary search there.

SUGGESTED CLUSTER ACTIVITIES

Thinking Puzzle

(Language Arts)

Authors generate ideas and predict outcomes in order to develop plots and characters for what they write. Student authors do the same when they write or tell a story.

Select several interesting action pictures from magazines. Cover each picture with a piece of construction paper that has a section cut out exposing a small part of the actual picture. The exposed part may show a face with an interesting expression, a part of a larger whole, or an interesting texture. Place the covered pictures on the chalkboard or bulletin board. Number each picture. Ask each student to select a picture and imagine what it is all about based on just the exposed part. Have each student do the following:

GENERATE ALTERNATIVES for story main ideas.

MAKE AN IDEA TREE reflecting the possibilities for a story. The core of the idea tree should be the main idea the student chooses, and the branches should show the various alternatives.

PREDICT OUTCOMES for alternatives by thinking through **IF THIS . . . THEN WHAT?**

WRITE or TELL a story about the whole picture based on the small exposed part and the alternatives selected from the idea tree. Compile the written stories into an **Alternative Storybook**, along with the various pictures and idea trees, for pleasure reading during free reading time. Put stories that are told on tape for pleasure listening.

Conservation of Space

(Mathematics, Science)

Conserving space in the classroom is important since so many people are involved in a rather confined area. Ask the students to think about the best arrangement for their classroom. **DISCUSS** and **LIST** the factors that would need to be taken into consideration. These might include location of heating, lighting, and ventilation; location of chalkboard, overhead projector, and bulletin boards; location of special interest, library and study areas; arrangement of teachers' and students' desks.

The following tasks may help generate possible alternatives:

CREATE a SCALE DRAWING of the room and its furniture. **BRAINSTORM** possible classroom arrangements by dividing the class into small groups. Establish leaders for each group and have each group make a list of their alternatives.

PRESENT each group's list by having a panel composed of the group leaders. **EVALUATE** (if this . . . then what?) the suggested alternatives.

USE REFERENCE MATERIALS on room design to aid in deciding on the best classroom arrangement. This can broaden to an interest in furniture, house, or car design. How do designers conserve space?

The final step should be a rearrangement of the classroom based on the best alternatives.

Medical Dilemma

(Health, Science)

Alexander Fleming's discovery of penicillin is often called the birth of modern medicine because it gave us a way to

combat disease. Today, however, our major diseases are not so easily dealt with by using penicillin or antibiotics. Present students with a problem modern medicine is grappling with. What are the alternatives we have for dealing with heart trouble?

GENERATE ALTERNATIVES. 1) If the heart is no longer functioning properly, how can we treat it? Encourage responses (such as hospital care, heart pacemaker, diet, rest, exercise). Predict outcomes by asking **IF THIS . . . THEN WHAT?** 2) Change perspective. How can we save lives if a heart is beyond repair? Encourage responses (such as transplant, part replacement, artificial heart). Predict outcomes. 3) Check underlying assumptions. Perhaps the problem really concerns trying to prevent heart trouble. How can we do that? Encourage responses (such as diet, exercise, relieve tension and stress, moderation with smoking and drinking). Predict outcomes.

PRESENT a report on the heart and its function or the causes of heart trouble or what to do if someone has a heart attack. **PRESENT** a report on the kind of exercise or diet program that one should have for preventing heart trouble. What are some things that fifth and sixth graders can do to get in the habit of exercising right and eating right? Do an **INFORMATION SEARCH**.

BRAINSTORM a commercial for heart trouble prevention.

Early Civilizations

(Social Studies, Science)

Present students with a problem that existed in early Egyptian, Chinese, or North and South American Indian civilizations. Each of these civilizations had to determine how to move their possessions and their building supplies. The civilizations generally settled in river valley areas. Paved roads were either extremely rough or did not exist. If the students lived then and were faced with moving their possessions over long distances, what alternatives for moving materials would they choose?

Students may explore the different approaches early civilizations took to the problem of transporting materials in some of the following ways:

BRAINSTORM what would need to be invented to move possessions over long distances.

BRAINSTORM the alternatives for moving materials if the students were engineers faced with building pyramids, temples, coliseums, or palaces.

USE REFERENCE MATERIALS to learn about and make **DIAGRAMS** of actual inventions such as the wheel, wheelbarrow, sedan chair, animal cart, or river craft. Explain which alternatives seemed to work best or equally as well. Explain how some of our present-day alternatives have been based on inventions from early civilization.

BRAINSTORM an alternative to the use of the present-day car for major transportation. **DESIGN** and **REPORT** on the resulting transportation system.

Skills Essential to Learning Field Test
Information on Warm-up Programs

MANY WAYS TO GO

Teaching Points

1. People use different styles and approaches when solving problems.
2. People can use "Hey Wait! Think, See, So?" in different ways.

Program Summary

Three girls use "Hey Wait! Think, See, So?" as a guide to help them prepare for a free-style ice-skating competition. They all use the guide differently. One researches ice-skating at the library and interviews others who have competed in previous years; the second experiments with different skating patterns using a video-recorder; and the third gets ideas from music and from nature for expressing herself on the ice.

BRAINSTORMING

Teaching Points

1. Brainstorming is a technique for generating as many ideas as possible, organizing the ideas into useful categories, and selecting the best alternative.
2. The rules for the idea generating session include:
 - a. Build on each other's ideas.
 - b. No comments.
 - c. Have a leader.
 - d. Write it down.

Program Summary

Three winners in a school poster contest are invited to help an advertising agency brainstorm ideas for a water safety commercial. The advertising executive who acts as group leader explains that brainstorming is a technique they use to get their thinking going. The rules during the initial session include thinking up as many ideas as possible, even crazy ones, and not commenting about other people or their ideas. The ideas that are generated are organized into categories later. In a final session, the group evaluates the ideas and selects the best alternatives. When this brainstorming technique results in an effective commercial five weeks later, the students realize how useful the procedure can be for their own projects.

APPENDIX B

DATA COLLECTION INSTRUMENTS
USED IN FIELD TEST

CLASSROOM STATUS FORM

Class No. _____

1. Date: _____
(month and year)
2. Grade level of class (circle all that apply):
3 4 5 6 7 8
3. How often does class use instructional television?
☐ Once a week or more
☐ At least once every two weeks
☐ At least once a month
☐ Less than once a month
☐ Never or television not available
4. Number of students in class: _____
5. Student racial/ethnic membership (count):
____ White
____ Black
____ Hispanic
____ Oriental
____ American Indian
____ Other (please specify): _____
6. Socio-economic status of the class (check one):
☐ Lower
☐ Lower middle
☐ Middle
☐ Upper middle
☐ Upper
7. Ability level of class (check one):
☐ below average ☐ average ☐ above average

Skills Essential to Learning
November - December, 1978
Collecting Information Cluster Field Test

INSTRUCTIONS FOR NARRATIVE OF CLASSROOM ACTIVITY

Time of Use: Period immediately preceding and following SEL program screening.

Focus of Use: Student and teacher interaction and activities occurring during observation period.

Degree of Detail: As much as possible. Coders will need to code categories from your notes.

Guidelines for recording observations:

1. As soon as the pre-program discussion begins, begin to write a running account of the verbal interaction between students and teacher. Write teacher comments on the left side of the forms provided, students on the right; this eliminates the need to repeatedly note the "The teacher said ... etc."
2. You will note the time designations accompanied by dashed horizontal lines -- keep within these time blocks to the extent possible.
3. Use a question mark to denote questions even if your notes are in the declarative. Use a slash to separate comments from different speakers.
4. When the program is shown, limit narrative to significant events which occur: interruptions, technical problems, comments heard by the entire class, etc.)
5. Resume the narrative immediately as the TV program ends. If, however, the class sees the program in one location and moves to another prior to the lesson, make a note of that fact. Then resume the narrative when the lesson begins. If the lesson goes beyond 30 minutes, summarize the remainder on the back of the last sheet.

Questions to keep in mind as you write your narrative:

1. What is the focus of the lesson? A recall of program content? Application of content to other classwork? A theoretical discussion of information collection without direct relation to any other academic or extra curricular topic?

2. If the program content IS integrated with other academic pursuits or aspects of student life, how is that done?
3. What judgments (pro and con) do they render about the program itself?
4. What areas of basic skills instruction are touched upon in discussion? To which area of the curriculum are skills related (e.g., language arts, math, science, etc.) Be as complete as possible in noting specifics.
5. Does teacher define terms or clarify particular concepts? Which ones?
6. What seems clear to students? What is confusing? Are there any noticeable differences in the responses of boys vs. girls, more mature vs. less mature students?

SKILLS ESSENTIAL TO LEARNING

November - December 1978

Collecting Information Cluster Field Test

Pre-program narrative

Class _____

Lesson _____

City _____

Observer's Name _____

	TEACHER	STUDENTS
1		
2		
3		
4		
5		
180		181

Go to next page ...

SKILLS ESSENTIAL TO LEARNING
Pre-program narrative

Page 2 of 9
6-10 minutes

B6

	TEACHER	STUDENTS
6		
7		
8		
9		
10		

Go to next page ... 182

183

Instructions: Identify portion of program when significant classroom event occurs.

TEACHER

STUDENTS

184

Go to next page ...

185

B7

SKILLS ESSENTIAL TO LEARNING
Post-program Narrative

Page 4 of 9
0-5 minutes

B8

Minutes	TEACHER	STUDENTS
1		
2		
3		
4		
5		

186

Go to next page ...

187



Minute	TEACHER	STUDENT'S
6		
7		
8		
9		
10		

Go to next page ...

SKILLS ESSENTIAL TO LEARNING
Post-program Narrative

Page 6 of 9
11-15 minutes

B10

Minute	TEACHER	STUDENTS
11		
12		
13		
14		
15		

190

191

Minute TEACHER

STUDENTS

16

17

18

19

20

SKILLS ESSENTIAL TO LEARNING
Post-program Narrative

Page 8 of 9
21-25

312

Minute TEACHER

STUDENTS

21

22

23

24

25

194

195

Minute TEACHER

STUDENTS

26

27

28

29

30

196

197

B13

INSTRUCTIONS FOR THE SUMMARY OBSERVATION FORMS 91, 92, and 93

Time of Use: During or immediately following SEL program.

Focus of Use: Classroom follow-up activities.

Guidelines for Recording Observations:

Section 1.

Of equal importance are the two main points: when the follow-up occurred and how long it was.

If follow-up does not occur immediately, you will be able to fill out only page 1. If possible, ascertain the teacher's intent to provide follow-up at another time without suggesting that a lesson should be provided. The teacher must feel free to use the programs in whatever way seems most appropriate for the class.

If follow-up is to occur at another time, try to arrange being there to observe. Note the time even if you are unable to be there.

Section 2.

Problems with equipment might interfere with the effectiveness of the programs and possibly the viewer's motivation to attend to the program. We want to know about such possible interferences.

Examples:

- A. Picture rolls or flips — note the frequency during the program, since a single occasion interferes much less than a consistent occurrence.
- B. Color disappears or comes and goes.
- C. Audio is garbled throughout program, or unintelligible.
- D. Glare from sun or lights may interfere with the viewing of children in a particular part of the room.
- E. Interruption by a fire drill — please note the segment of program in which disturbance occurs.

Section 3.

The primary concern for this section is knowing the difference between a recall and comprehension lesson and an application lesson. For the most part the terms follow the usual educational meanings.

The recall and comprehension lesson focuses primarily on the first two levels of Bloom's taxonomy for objectives. The application lesson focuses primarily on the upper levels of Bloom's description.

Another way of expressing the difference is that a recall and comprehension lesson focuses on thinking, talking, and/or writing about information collection concepts. An application lesson focuses on thinking, talking, and/or writing about the doing of information collection. Obviously doing an information collection activity would also be an application lesson.

Examples of a Recall and Comprehension Lesson:

1. Teacher leads a question and answer discussion about the program. Questions range from the information collection activities of specific characters to an abstract discussion of the information collection activities.
2. Students write a summary of what they learned about collecting information from the TV program.
3. Teacher discusses use of encyclopedias in the program and/or in general.

Examples of an Application Lesson:

1. Teacher asks students to pick one of several problems and write down all the information needs he/she would have in solving the problem.
2. Discussion could center on how the class could apply the program concepts to setting up a school garage sale.
3. Small groups of students might generate information needs for completion of a social studies report; then plan the sources and techniques for collecting the information. Report orally to class.
4. Students could be asked to use the slogans "What do I know? What do I need to know?" to write up a plan for (A) planning a family vacation, (B) becoming an Eagle Scout, or (C) becoming a carpenter, scientist, member of Congress, or other vocational choice.
5. Use of a sheet of classified ads to see if any of the lost and found items match up.

If only one type of lesson occurs, fill out the relevant part of the observation schedule.

Frequently, however, a teacher will review the program content before asking students to complete an application task. In that case, both parts should be filled out.

Instructions for the Summary Observation Forms 91, 92, and 93

3

In a few cases, the classroom activity may be a recall and comprehension lesson in its primary focus. Interspersed, however, are a few questions which force at least a mental application of the concepts.

The "***Application as a Secondary Focus*" section should be completed even though "Part B--Application Lesson" need not be filled out.

An example is that Teacher A may ask students to recall information collection sequences from the program. Then students are asked to think of times when they, individually or as a group, have collected information and how they did it (an application question). After a few responses, the discussion immediately is re-focused on the program.

Later, in the previous example, the teacher may make an obvious transition to an application activity. "OK, now let's try this out...here are the copies of newspaper ads and encyclopedia articles. Using the, construct a plan for..." At that point you would turn your attention to Part B and fill it out as well.

Skills Essential to Learning
November - December 1978
Collecting Information Cluster Field Test

Summary Sheet for Observation of Classrooms using
Program 1: What Do I Know?

Section 1. Time of Follow-up Observer's Name _____

Program Shown: Date _____ Hour _____

() Immediately following program
Length (minutes) _____

() Other - Date _____
Time follow-up starts _____
Time follow-up ends _____
Length of follow-up (minutes) _____

() No follow-up. Comment _____

Section 2. Context of observation

Television monitor () Black and White () Color

Quality of Reception

Visual () Good () Problem(s) _____
Audio () Good () Problem(s) _____

Problem with specific segment of program - identify segment _____

Location of viewing program

() traditional classroom
() open classroom
() other (e.g., library) _____

Section 3. Follow-up Activity

Two major types of lessons might occur. The first focuses on the recall and comprehension of program material. The second focuses on the application of the material.

If a recall and comprehension lesson only occurs, fill out Part A.
If an application lesson only occurs, fill out Part B.
In most cases, both will occur, and both Parts A and B should be filled out.

PART A: Recall and Comprehension Lesson

1. Main Thrust of Lesson:

- ☐ Review of program events and content
- ☐ Usefulness of program content
- ☐ Attitudinal or affective responses of students to program
- ☐ Review of mnemonic as primary focus

2. Did the lesson cover any or all of the following:

- ☐ determining information needs when (check all that apply):
 - ☐ solving a problem
 - ☐ pursuing an interest
 - ☐ other _____
- ☐ planning for an information collection activity (check all that apply)
 - ☐ the value of
 - ☐ techniques for
 - ☐ other _____
- ☐ the use of standard reference aids: classified ads
- ☐ topic other than above _____

3. Characteristics of discussion: teaching style and student interaction

	None	Some	Much
Teacher lectures or explains	☐	☐	☐
Teacher-initiates questions	☐	☐	☐
Students respond to teacher questions	☐	☐	☐
Spontaneous comments by students	☐	☐	☐
Students react to other student responses	☐	☐	☐

4. Content of lesson related to (check all that apply):

- ☐ a review of program content (e.g., what happened to the characters or recitation of parts liked best by students, etc.)
specify or give examples _____
- ☐ student life activities outside of school
specify or give examples _____

- () regular school activities related to curriculum areas
specify or give examples _____
- () special school activities (field trip, extra-curricular, etc.)
specify or give examples _____
- () other _____

****Application as a Secondary Focus****

Even though the lesson emphasizes recall and comprehension of the program, discussion may include some questions or comments which indicate application of the concepts.

5. Check all of the topics below which are touched upon in application-type discussions:

- () determining information needs
() planning an information collection activity
() using parts of a newspaper
() other application topic _____

6. Check all the areas below to which the program concepts are applied.

- () regular school activities related to curriculum area
(specify) _____
- () special school activities (field trip, extra-curricular, etc.)

- () student life activities outside of school _____

- () other _____

PART B: Application Lesson

1. Did the teacher provide a lesson requiring that the students

() determine information needs when (check all that apply)

☐ solving a problem
☐ pursuing an interest
☐ other _____

() plan an information collection activity

() use the parts of a newspaper (check all that apply):

☐ the index
☐ the classified ad section
☐ other _____

() topic of activity other than above _____

*** Characteristics of Lesson ***

2. Task () one task imposed by teacher for all students
 () students select from teacher-generated array of tasks or topics
 () students generate tasks or topics alone
 () students and teacher generate tasks or topics as group

3. Implementation of Lesson

() Individual () Assigned for completion in class
 () Small Group () Assigned as homework
 () Whole class as one group

4. Content of Lesson Related to:

() TV program content only
 () specific curriculum area of regular school activities
 specify area(s) _____
 () multiple curriculum areas (list) _____

 () special school activities (e.g., field trip, etc.)
 specify activities _____
 () student life outside of school
 specify or give examples _____

5. Product of Lesson

- ☐ written exercise
☐ simulation or game experience
☐ verbal report to class
☐ other _____
☐ none _____

6. Use of resources

- ☐ Activity requires use of books

☐ encyclopedia
☐ dictionary
☐ newspaper
☐ library reference books
☐ text books or workbooks, etc.
☐ periodicals
☐ other _____

- ☐ Activity requires use of audio visual materials _____

- ☐ Interviews with other people

- ☐ Records available to students (e.g., number of basketball games played, won, lost)

7. Response of students during Lesson (check the space 1-5 that best depicts student responses)

	1	2	3	4	5	
Enthusiastic	—	—	—	—	—	Bland
Intellectually challenged	—	—	—	—	—	Perfunctory
Remained on task	—	—	—	—	—	Easily Distracted
Verbally expressed interest	—	—	—	—	—	Verbally expressed disinterest

- ☐ Because responses were so varied across students, a summary judgment about the class is impossible to make.

Comments: _____

Skills Essential to Learning
November - December 1978
Collecting Information Cluster Field Test

Summary Sheet for Observation of Classrooms using
Program 2: Where Do I Go?

Section 1. Time of Follow-up Observer's name _____

Program Shown: Date _____ Hour _____

() Immediately following program
Length (minutes) _____

() Other - Date _____
Time follow-up starts _____
Time follow-up ends _____
Length of follow-up (minutes) _____

() No follow-up. Comment _____

Section 2. Context of Observation

Television monitor () Black and White () Color

Quality of Reception

Visual () Good () Problem(s) _____
Audio () Good () Problem(s) _____

Problem with specific segment of program - identify segment _____

Location of Viewing Program

() traditional classroom
() open classroom
() other (e.g., library) _____

Section 3. Follow-up Activity

Two major types of lessons might occur. The first focuses on the recall and comprehension of program material. The second focuses on the application of the material.

If a recall and comprehension lesson only occurs, fill out Part A.
If an application lesson only occurs, fill out Part B.
In most cases, both will occur, and both Parts A and B should be filled out.

PART A. Recall and Comprehension Lesson

1. Main Thrust of Lesson

- ☐ Review of program events and content
- ☐ Usefulness of program content
- ☐ Attitudinal or affective responses of students to program
- ☐ Review of mnemonic as primary focus

2. Did the lesson cover any or all of the following:

- ☐ the value of planning an information collection activity in terms of (check all that apply)

☐ types of sources
☐ locating sources
☐ selecting an appropriate source

- ☐ techniques of planning an information collection activity in terms of (check all that apply)

☐ types of sources
☐ locating sources
☐ selecting an appropriate source

- ☐ locating print reference materials in

☐ a library
☐ a media center

- ☐ using standard reference aid: encyclopedia

- ☐ topic other than above _____

3. Characteristics of discussion: teaching style and student interaction

	None	Some	Much
Teacher lectures or explains	☐	☐	☐
Teacher-initiates questions	☐	☐	☐
Students respond to teacher questions	☐	☐	☐
Spontaneous comments by students	☐	☐	☐
Students react to other student responses	☐	☐	☐

4. Content of lesson related to (check all that apply):

- ☐ a review of program content (e.g., what happened to the characters or recitation of parts liked best by students, etc.)
 specify or give examples _____

- ☐ student life activities outside of school
 specify or give examples _____

- () regular school activities related to curriculum areas
specify or give examples _____
- () special school activities (e.g., field trip, extra-curricular, etc.)
specify or give examples _____

****Application as a Secondary Focus****

Even though the lesson emphasizes recall and comprehension of the program, discussion may include some questions or comments which indicate application of the concepts.

5. Check all of the topics below which are touched upon in application-type discussion:

- () identification of sources of information appropriate to a purpose
- () location of sources of information appropriate to a purpose
- () select sources of information appropriate to a purpose
- () locating print reference materials
- () use of encyclopedia
- () other _____

6. Check all the areas below to which program content is applied

- () regular school activities (curriculum related) _____
- () special school activities (e.g., extra-curricular) _____
- () student life outside of school _____
- () other _____

PART B: Application Lesson

1. Did the teacher provide an activity requiring students to

- ☐ identify sources of information appropriate to a purpose
 - ☐ locate sources of information appropriate to a purpose
 - ☐ select sources of information appropriate to a purpose
 - ☐ locate print reference materials in a library or media center
 - ☐ use a standard reference aid: encyclopedia
 - ☐ topic other than above _____
- _____
- _____

** Characteristics of Lesson**

2. Task ☐ one task imposed by teacher for all students
☐ students select from teacher-generated array of tasks or topics
☐ students generate tasks or topics alone
☐ students and teacher generate tasks or topics as group

3. Implementation of Lesson

- | | |
|---|---|
| ☐ Individual | ☐ Assigned for completion in class |
| ☐ Small Group | ☐ Assigned as homework |
| ☐ Whole class as one group | |

4. Content of Lesson Related to:

- ☐ TV program content only
- ☐ Specific curriculum area of regular school activities
specify area(s) _____
- ☐ multiple curriculum areas (list) _____
- ☐ Special school activity (e.g., field trip, etc.)
specify activities _____
- ☐ Student life outside of school
specify or give examples _____

5. Product of Lesson

- ☐ written exercise
- ☐ simulation or game experience
- ☐ verbal report to class
- ☐ other _____
- ☐ none _____

6. Use of resources

() Activity requires use of books

- ☐ encyclopedia
☐ dictionary
☐ newspaper
☐ library reference books
☐ text books or workbooks, etc.
☐ periodicals
☐ other _____

() Activity requires use of audio visual materials _____

() Interviews with other people

() Records available to students (number of basketball games played)

() other _____

7. Response of students during Lesson (check the space 1-5 that best depicts student responses)

	1	2	3	4	5	
Enthusiastic	_____	_____	_____	_____	_____	Bland
Intellectually challenged	_____	_____	_____	_____	_____	Perfunctory
Remained on task	_____	_____	_____	_____	_____	Easily Distracted
Verbally expressed interest	_____	_____	_____	_____	_____	Verbally expressed disinterest

() Because responses were so varied across students, a summary judgment about the class is impossible to make.

 Comments: _____

Class # _____
Form # 93

Skills Essential to Learning
November - December 1978
Collecting Information Cluster Field Test

Summary Sheet for Observation of Classrooms using
Program 3: What Should I Do?

Section 1. Time of Follow-up Observer's Name _____

Program Shown: Date _____ Hour _____

() Immediately following program
Length (minutes) _____

() Other - Date _____
Time follow-up starts _____
Time follow-up ends _____
Length of follow-up (minutes) _____

() No follow-up. Comment _____

Section 2. Context of observation

Television monitor () Black and White () Color

Quality of Reception

Visual () Good () Problem(s) _____
Audio () Good () Problem(s) _____

Problem with specific segment of program - identify segment _____

Location for Viewing Program

() traditional
() open classroom concept
() other (e.g., library) _____

Section 3. Follow-up Activity

Two major types of lessons might occur. The first focuses on the recall and comprehension of program material. The second focuses on the application of the material.

If a recall and comprehension lesson only occurs, fill out Part A.

If an application lesson only occurs, fill out Part B.

In most cases, both will occur, and both Parts A and B should be filled out.

PART A: Recall and Comprehension Lesson

1. Main Thrust of Lesson

- ☐ Review of program events and content
- ☐ Usefulness of program content
- ☐ Attitudinal or affective responses of students to program
- ☐ Review of mnemonic as primary focus

2. Did the lesson cover any or all of the following:

- ☐ ways to gather information
- ☐ collecting information to answer specific questions by conducting a survey
- ☐ interviewing resource persons to gain specific information
- ☐ reading and making a bar graph
- ☐ finding the arithmetic average
- ☐ topic other than above _____

3. Characteristics of discussion: teaching style and student interaction

	None	Some	Much
Teacher lectures or explains	☐	☐	☐
Teacher-initiates questions	☐	☐	☐
Students respond to teacher questions	☐	☐	☐
Spontaneous comments by students	☐	☐	☐
Students react to other student responses	☐	☐	☐

4. Content of lesson related to (check all that apply):

- ☐ a review of program content (e.g., what happened to the characters or recitation of parts liked best by students, etc.)
specify or give examples _____
- ☐ student life activities outside of school
specify or give examples _____
- ☐ regular school activities related to curriculum areas
specify or give examples _____
- ☐ special school activities (e.g., field trip, extra-curricular, etc.)
specify or give examples _____
- ☐ other _____

**** Application as a Secondary Focus ****

Even though the lesson emphasizes recall and comprehension of the program, discussion may include some questions or comments which indicate application of the concepts.

5. Check all of the topics below which are touched upon in application-type discussion:

- ☐ ways of gathering information
- ☐ conducting a survey
- ☐ interviewing
- ☐ reading and making a bar graph
- ☐ find an arithmetic average

6. Check all the areas below to which program concepts are applied:

- ☐ regular school activities - curriculum related _____
- ☐ special school activities (e.g., field trips, extra-curricular)

- ☐ student life outside of school _____

- ☐ other _____

PART B: Application Lesson

1. Did the teacher provide an activity requiring students to
- ☐ identify sources of information appropriate to a purpose
 - ☐ locate sources of information appropriate to a purpose
 - ☐ select sources of information appropriate to a purpose
 - ☐ locate print reference materials in a library or media center
 - ☐ use a standard reference aid: encyclopedia
 - ☐ topic other than above _____
- _____
- _____

** Characteristics of Lesson **

2. Task ☐ one task imposed by teacher for all students
- ☐ students select from teacher-generated array or tasks of tasks or topics
 - ☐ students generate tasks or topics alone
 - ☐ students and teacher generate tasks or topics as group

3. Implementation of Lesson

- | | |
|---|---|
| ☐ Individual | ☐ Assigned for completion in class |
| ☐ Small Group | ☐ Assigned as homework |
| ☐ Whole class as one group | |

4. Content of Lesson Related to:

- ☐ TV program content only
- ☐ Specific curriculum area of regular school activities
specify area(s) _____
- ☐ multiple curriculum areas (list) _____
- ☐ Special school activity (e.g., field trip, sports, etc.)
special activities _____
- ☐ Student life outside of school
specify or give examples _____

5. Product of Lesson

- ☐ written exercise
- ☐ simulation or game experience
- ☐ verbal report to class
- ☐ other _____
- ☐ none _____

6. Uses of resources

() Activity requires use of books

- encyclopedia
- dictionary
- newspaper
- library reference books
- text books or workbooks, etc.
- periodicals
- other _____

() Activity requires use of audio visual materials

() Interviews with other people

() Records available to students (e.g., number of basketball games played, won, lost)

7. Response of students during lesson (mark the space 1-5 with a check indicating degree of student response)

	1	2	3	4	5	
Enthusiastic	—	—	—	—	—	Bland
Intellectually challenged	—	—	—	—	—	Perfunctory
Remained on task	—	—	—	—	—	Easily Distracted
Verbally expressed interest	—	—	—	—	—	Verbally expressed disinterest

() Because responses were so varied across students, a summary judgment about the class is impossible to make.

Comments: _____

B. Jochums
11/20/78

Instructions for Observation of Context

This observation will provide baseline or comparison data. We will relate it to data or classroom activity during the periods of time when programs are shown.

You will observe the classroom for a 40 minute period. If it is inconvenient to leave the room when your 40 minutes of observation is completed, make additional comments on the back of the form, but check off the form only for the designated period.

Section I. We hope you will see one cohesive lesson; however, that may not be possible during each observation period. In Section I, check the curriculum area of major focus. Major focus will be determined in terms of the amount of time devoted to it.

If a second lesson occurs OR if a second curriculum area is included as a secondary focus, list the curriculum area(s) involved on the right-hand side of the sheet.

Section II. Definitions for Tally of General Comments.

"Strategies for collecting information" includes identifying information needs, planning collection activities, sources of information, using techniques for displaying information, etc. Include here comments about the SEL programs on "Collecting Information."

"Problem Solving Skills" includes a wide variety of activities but, in this case, excludes information collection. Examples of problem solving skills are defining a problem, setting up criteria, making generalizations, logical reasoning, identifying errors in thinking, and generating alternatives.

"Personal study skills" also include a wide range of work management and time management issues. They include making a time line for activities, taking notes, increasing reading efficiency, etc.

Tally the number of conversational units evidenced by students and teachers. We will discuss a conversational unit in the training session. Briefly, it is one connected utterance by a single individual. Both one sentence and a 5 minute mini-lecture could be a conversational unit. Tally only those which fall into one of the 5 categories. If you mark the SEL specific comment box in Section III, you will also mark the Strategies for Collecting Information general comments box.

The estimate of time will, of necessity, be a rough estimate. It is the approximate amount of time devoted to the category over the entire observation period.

This section can be completed whether or not the class sees SEL programs.

Section III. This section is designed to pick up information about the times SEL programs are mentioned during class periods other than those in which programs are shown.

During some observation periods no mention of SEL may occur. In that case, a check need only be made in the last option of Part B.

Class # _____

SKILLS ESSENTIAL TO LEARNING
November 1978
Collecting Information Cluster Field Test

Observation of Classroom Context

Date _____

Note: Make additional comments in the
 margins or on back of sheets.

Time _____^{am} to _____^{am}
 _____^{pm} _____^{pm}

Observer's Name _____

I. Description of Observed Classroom Activity**A. Curriculum Area (Major Focus)**

- () Language Arts
 () Reading
 () Math
 () Social Studies
 () Science
 () Other _____

If two lessons were observed, list
 curriculum areas included:

B. Type of Teaching Methodology (check all that apply)

- () Teacher led discussion
 () Individual work (seated)
 () Small group co-operative assignment
 () Individual or group activity at classroom learning centers
 () Media presentation — specify what type _____

 () Simulation (instructional games, role playing, etc.)
 Specify _____

 () Peer tutoring
 () Other _____

II. General Comments

Instructions: Interaction in a classroom might involve conversation on one or more of the 3 categories below, even though the SEL programs are not mentioned, and even though the SEL programs have not been seen. Tally the number of times these topics are a focal part of the classroom activity.

Category	Tally (total)	Approx. total time
Strategies for collecting information	()	___ less than 5 minutes ___ 6 - 10 minutes ___ 11 - 15 minutes ___ over 15 minutes
Problem Solving Skills in general — reasoning and thinking	()	___ less than 5 minutes ___ 6 - 10 minutes ___ 11 - 15 minutes ___ over 15 minutes
Personal study skills—how to, improvement of, time management	()	___ less than 5 minutes ___ 6 - 10 minutes ___ 11 - 15 minutes ___ over 15 minutes

None of the above categories were discussed. Check the box at the right. ☐

III. Specific comments regarding SEL programs or field activities (check all that apply):

Category	Tally (total)	Approx. total time
A. SEL mentioned by: () teacher () student () other _____	()	___ less than 5 minutes ___ 6 - 10 minutes ___ 11 - 15 minutes ___ over 15 minutes
N. bread & butterflies () teacher () student () other _____	()	___ less than 5 minutes ___ 6 - 10 minutes ___ 11 - 15 minutes ___ over 15 minutes

C. Program content used was:

- () mnemonic — "What Do I Know?...What Do I Need to Know?" or other easily remembered statements
- () storyline (e.g., characters, events, etc.)
- () educational message on
 - ___ information needs
 - ___ sources of information
 - ___ collecting information
- () other _____

D. Comments about SEL occurred as:

- () focus of activity or lesson
- () part of instructions or directions
- () incidental comment (e.g., reminder or "hint," apparently not planned by teacher as part of lesson)
- () only in connection with acknowledgment of observer's presence
- () no comments were made during the entire observation period

E. Briefly describe other aspects of the occasion, context, and use made of the SEL program:

INSTRUCTIONS FOR ADMINISTERING
STUDENT QUESTIONNAIRES
A,B,E,F

The questionnaires in this packet are in two versions, either A and B or E and F.

To distribute these tests give Form A (or E) to the 1st, 3rd, 5th, 7th, etc. children as they are listed in your rollbook. Form B (or F) will be given to the 2nd, 4th, 6th, 8th, etc. children listed.

If your class gets both a pre- and post-test each child should get the same version at each testing session.

When you hand out the questionnaires, make sure the students write in their grade and sex, but not their names.

Because we do not want this to be a test of the student's reading ability, you may help students with words they do not know. You may tell them to raise their hands if they don't know a word or understand a direction and you may read the words to them or explain the direction. Please try not to lead them to any answers in your explanation.

I am in grade ____

I am a boy ____
girl ____

STUDENT QUESTIONNAIRE

1. Suppose your teacher assigned a project on the history of your city. You will need to collect information about your town from 1928 to 1978. List all the ways you can think of to collect information about your city's history.

2. Below is information about two boys, Bob and Paul. After you read about the boys, answer "a", "b" and "c."

Bob likes to play sports. He tries to think first before doing things, and he is a good student. Bob also likes to watch his favorite television program.

Paul likes to help his friends. He sometimes acts without thinking first, and he gets good marks in school. Paul also tries to help around the house as much as he can.

- a. Both Bob and Paul want to get new bicycles. Both of them want to get a good bike that is priced right for them. Which boy do you think will collect information to help him choose his bike?

() Paul
() Bob
() I don't know

- b. Which boy will most likely waste more time when he tries to find out about new bikes?

() Paul
() Bob
() I don't know

- c. Who would you rather be friends with?

() Paul
() Bob

For questions 3-7, check (✓) the one answer you think is best.

3. Pete wanted to know what the favorite flavor of ice cream was in his class. What should he do first to find out?
- () A. Buy some ice cream and see how many students eat it.
 - () B. Ask his teacher to tell him.
 - () C. Ask two friends what they like best.
 - () D. Make a list and have the class vote.
4. What would happen if first Pete buys ice cream to see how many students will eat it?
- () A. If everyone eats it, then he will know it is their favorite
 - () B. He may not know what the favorite flavor is.
 - () C. He may be wasting time and money.
 - () D. Both B and C are right.
5. What would happen if first Pete asks his teacher to tell him the favorite ice cream flavor?
- () A. She could tell him.
 - () B. He would save time.
 - () C. She would not know the answer.
 - () D. Both B and C are right.
6. What would happen if first Pete asks two friends what their favorites are?
- () A. He will know the favorite of the class because his friends are in the class
 - () B. If the two friends like the same flavor then the whole class will probably like the same flavor.
 - () C. He will not have enough information.
 - () D. He will be saving time.
7. What would happen if first Pete makes a list of flavors and has the class vote?
- () A. He will waste a lot of time.
 - () B. He will find out what he wants to know.
 - () C. The class will not understand what to do.
 - () D. Both A and C are right.

8. Suppose you wanted to give a birthday party for a friend. There are several things you would have to do before the party started.

Listed below are some things you might do to give a good party.

Put a check (✓) by the first 3 things you would need to do to give a good party. You will put 3 checks in all.

- | | |
|--|---|
| ☐ bake a cake | ☐ decide on a menu |
| ☐ save enough money | ☐ blow up balloons |
| ☐ invite your best friend | ☐ make a list of who |
| ☐ figure out how much the | to invite |
| party will cost | ☐ buy a present |

I am in grade _____

I am a boy _____

girl _____

STUDENT QUESTIONNAIRE

1. Mr. Smith's class has been given \$75.00 to buy a gift for their school. The gift must be something the school needs and something everyone will enjoy. Mary was chosen to find the best way to spend the money.

a. What is the first thing Mary should do?

b. Where can Mary get the information she needs? Make a list of all the ways Mary could find the information. Think of as many ways as you can.

2. Below is information about two boys, Bob and Paul. After you read about the boys, answer "a," "b," and "c."

Bob likes to play sports. He sometimes acts without thinking first, and he is a good student. Bob also likes to watch his favorite television program.

Paul likes to help his friends. He tries to think first before doing things, and he gets good marks in school. Paul also tries to help around the house as much as he can.

- a. Both Bob and Paul want to get new bicycles. Both of them want to get a good bike that is priced right for them. Which boy do you think will collect information to help him choose his bike?

- () Paul
() Bob
() I don't know

b. Which boy will most likely waste more time when he tries to find out about new bikes?

- () Paul
- () Bob
- () I don't know

c. Who would you rather be friends with?

- () Paul
- () Bob

For questions 3 - 7, Check the one answer you think is best.

3. Sally lost her watch, but she doesn't know where. What should she do first to find it?

- () A. Listen to the radio lost and found.
- () B. Ask her friends to help look for it.
- () C. Think of different ways to find it.
- () D. Look back in her school classroom.

4. What would happen if Sally first listens to the radio for the lost and found?

- () A. She will probably hear about her watch.
- () B. She will be missing other ways to find her watch.
- () C. Nobody will find the watch to report it.
- () D. She may waste time.

5. What would happen if Sally first asks her friends to look for the watch?

- () A. They might find it or they might not.
- () B. She will miss other ways of finding the watch.
- () C. She will be sure to find it.
- () D. She may waste time.

6. What would happen if Sally first thinks about different ways of finding her watch?

- () A. She will waste time.
- () B. Somebody else will find the watch.
- () C. Her friends will not help her.
- () D. She will look in better places.

7. What would happen if Sally first looks back in her school classroom?

- ☐ A. She will probably find it.
- ☐ B. She will miss the radio lost and found program.
- ☐ C. She may waste time.
- ☐ D. She will probably have to look other places, too.

8. Suppose your teacher asked you to do a science project for the school science fair. There are several things you will have to do before entering your project in the fair.

Listed below are some things you might do to make a good science project.

Put a check (✓) by the 3 things you would need to do first to make a good science project. You will put 3 checks in all.

- | | |
|---|--|
| ☐ ask your teacher for help | ☐ fill out the science fair entry blank |
| ☐ decide on the information you need | ☐ list the ways to get the information you need |
| ☐ do a science experiment | ☐ write a report of the results of your experiment |
| ☐ choose an experiment to do | ☐ make a chart to show the results of your experiment |

I am in grade ____

I am a boy ____
girl ____

FINDING OUT ABOUT AIR POLLUTION

Air pollution is a problem in many towns and cities today. Doctors say that air pollution is bad for people's health.

Suppose your teacher asked you to find out (1) what causes air pollution in Knoxville and (2) how much air pollution was reported in Knoxville last month.

1. To solve this problem there are several things you will need to know. Make a list of all the things you can think of that you would need to know. Take time to think carefully.

- (a) _____
(b) _____
(c) _____
(d) _____
(e) _____
(f) _____

DO NOT COME BACK TO THIS PAGE

2. You will have to find out what air pollution is. How could you find out? Think of as many ways to collect that information as you can.

3. You will also have to find out what causes air pollution. How could you find the possible causes of air pollution?

4. You will need to know what particular things cause air pollution in Knoxville. Write down how you could find out. Think of as many ways as you can.

5. Then you could find out how much pollution was found in Knoxville last month. What ways would you use to find out about pollution last month?

DO NOT COME BACK TO THIS PAGE

6. To find out about air pollution you could look in books for information. List as many kinds of books as you can that might give you the information.

I am in grade ____

I am a boy ____
girl ____

STUDENT QUESTIONNAIRE

Most kids eat a lot of junk food as part of their regular diet. Doctors say that too much junk food is bad for your health and that too much sugar is a cause of tooth decay.

Suppose your teacher asked you to find out how much junk food was eaten by your whole class last week and how many grams of sugar were in all that food. How would you collect that information?

1. To solve this problem there are several things you will need to know. Make a list of all the things you can think of that you would need to know. Take time to think carefully.

- (a) _____
(b) _____
(c) _____
(d) _____
(e) _____
(f) _____

2. You will have to find out which foods are "junk food." Write down how you could find that information. Think of as many ways as you can.

3. You will also have to find out which junk foods have sugar in them. Write down how you could find that information. Think of as many ways as you can.

4. You will need to find out which junk foods were eaten by your classmates last week. Write down how you could find out. Think of as many ways as you can.

DO NOT GO BACK TO PAGE ONE

5. To find out about junk food, you could look in books for information. List as many kinds of books as you can that might give you the information.

6. To find out about junk food, you could ask different kinds of people who might know. List as many kinds of people as you can who might know about junk food.

7. If you wanted to find out how much junk food will be eaten by your class next week, you will have to plan how to get that information. Think of a plan to get that information, then write down what you would do.

DO NOT GO BACK TO PAGE ONE OR TWO

INSTRUCTIONS FOR ADMINISTERING STUDENT QUESTIONNAIRES (C. D)

These questionnaires are probably unlike any your students have ever done before, so it may take some time to explain how to answer them. The first page of each questionnaire is an explanation and practice sheet. You should work through the first sheet aloud together.

You should explain the examples as carefully as you can. You will probably need to explain that the nine lines correspond to the numbers on the scale and that the students are to put one 'x' mark on one of the lines for each pair of statements. Then explain that if statement A and statement B are thought to have something in common, the mark should be between 1 and about 4. If the statements are thought to have little or nothing in common, students should mark between about 6 and 9. "5" is the midpoint between "most alike" and "least alike."

After you have gone through the first sheet together, have students turn the page and read aloud down to the list of activities. Forms C and D list different activities, so have students read silently through the list on their forms. Ask if there are any questions and clarify any words or concepts they don't understand.

When everyone is ready, ask students to begin the exercise of comparing each activity with all the others.

To distribute these tests, give Form C to the 1st, 3rd, 5th, 7th, etc., child, as they are listed in your rollbook. Form D will be given to the 2nd, 4th, 6th, 8th, etc., child listed. If your class gets these questionnaires as both a pre-test and post-test, each child should get the same form both times.

When you hand out the questionnaires, make sure the students write in their grade and sex, but not their names.

The TEACHER'S COPY of the questionnaire gives you both what to read aloud and the lists students will be looking at on the two forms.

TEACHER'S COPY

Student Questionnaires C and D

Directions (Read aloud to students):

This exercise is to see how you compare different things. There are no right or wrong answers. We just want to see how you would compare these things.

Here is an example of how the exercise works. Just below, you will see where I compared an apple and a banana.

NOTE TO TEACHER: You should explain the example as carefully as you can. You will probably need to explain that the nine lines correspond to the numbers on the scale and that the students are to put one 'x' mark on one of the lines for each pair. Then explain that if statement A and statement B are thought to have something in common, the mark should be between 1 and about 4. If the statements are thought to have little or nothing in common, students should mark between about 6 and 9. "5" is the midpoint between "most alike" and "least alike."

most alike							least alike	
1	2	3	4	5	6	7	8	9
1								
2	1							
3	2	1						
4	3	2	1					
5	4	3	2	1				
6	5	4	3	2	1			
7	6	5	4	3	2	1		
8	7	6	5	4	3	2	1	
9	8	7	6	5	4	3	2	1

A. Apple
B. Banana

_____X_____

I thought they were both fruit so I marked them close to the most alike and.

Here is another example:

most alike							least alike	
1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9

A. Black
B. White

_____ **X**

Since they are opposites, I marked them at the end line under least alike. Someone else might have marked 1 or 2, thinking that black and white are both colors. Both of us would be right, since we both marked what we thought.

You try the next item. Remember any answer that makes sense to you is okay.

most alike									least alike
1	2	3	4	5	6	7	8	9	

A. Write an essay
B. Read a book

.....

Say to the students:

"Turn the page and read the instructions." (Continue reading aloud.)

"Now I would like you to compare different ways of doing a report. Suppose I assigned you a report on something you're interested in. It can be on any topic.

I have listed things you might do to help you complete the report. You might not have thought about some of these things before, but that's okay. In this exercise you will be comparing the different things you might do.

Read your list of things you might do. (Pause.) Are there any questions? Okay — begin."

Do not read the lists aloud since different items appear on the two student forms. Here are the lists:

Form C

1. List all kinds of information that could be used.
2. Compare books on the topic by reading the table of contents.
3. Choose the ways to collect information.
4. Write out the steps to complete the assignment.
5. Sum up the assignment in a chart or graph.
6. Define and compare different topics.
7. Figure out the best times to collect the available information.
8. Look for information to combine in a graph.
9. Compare people's opinions in a chart or list of statements.

Form D

1. Make a list.
2. Measure something.
3. Take notes.
4. Read a book.
5. Interview someone.
6. Read the newspaper.
7. Make a graph.
8. Read a chart.
9. Give out questionnaires. .
10. Take a survey.

If your class gets a pre-test and a post-test as well, the children should get the same form each time. Using the class roster should assure the correct form.

STUDENT EXERCISE

This is an exercise to see how you compare different things. There are no right or wrong answers. We just want to see how you would compare these things.

Here is an example of how the exercise works. Just below, you will see where I compared an apple and a banana.

	most alike	1	2	3	4	5	6	7	8	9	least alike
A. Apple											
B. Banana				X							

I thought they were both fruit so I marked them close to the "most alike" end.

Here is another example

	1	2	3	4	5	6	7	8	9
A. Black									
B. White									X

Since they are opposites, I marked them at the end line under "least alike". Someone else might have marked 1 or 2, thinking that black and white are both colors. Both of us would be right since we both marked what we thought.

You try the next item. Remember, any answer that makes sense to you is okay.

	1	2	3	4	5	6	7	8	9
A. Write a report									
B. Read a book									

I am in grade ____

I am a boy ____
girl ____

Now I would like you to compare different ways of doing a report. Suppose I assigned you a report on something you're interested in. It can be on any topic.

I have listed things you might do to help you complete the report. You might not have thought about some of these things before, but that's okay. In this exercise you will be comparing the different things you might do.

1. think of all the things you know about the topic
2. write down all the things you need to do
3. list all kinds of information you could use
4. choose the ways to collect the information
5. ask yourself what you need to know
6. find out what sources you might use
7. decide where to get the information
8. figure out which information is easiest to collect
9. decide which information is most useful

In the pairs below compare each of the activities in the list. Please think carefully about your answers.

- | | most alike | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | least alike |
|---|------------|---|---|---|---|---|---|---|---|---|-------------|
| A. think of all the things you know about the topic | | | | | | | | | | | |
| B. write down all the things you need to do | | | | | | | | | | | |
| A. figure out which information is easiest to collect | | | | | | | | | | | |
| B. decide which information is most useful | | | | | | | | | | | |
| A. write down all the things you need to do | | | | | | | | | | | |
| B. list all kinds of information you could use | | | | | | | | | | | |
| A. decide where to get the information | | | | | | | | | | | |
| B. figure out which information is easiest to collect | | | | | | | | | | | |
| A. think of all the things you know about the topic | | | | | | | | | | | |
| B. list all kinds of information you could use | | | | | | | | | | | |

- | | most alike | | | | | | | | | | | least alike |
|---|------------|---|---|---|---|---|---|---|---|--|--|-------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | |
| A. decide where to get the information | | | | | | | | | | | | |
| B. decide which information is most useful | | | | | | | | | | | | |
| A. write down all the things you need to do | | | | | | | | | | | | |
| B. choose the ways to collect the information | | | | | | | | | | | | |
| A. find out what sources you might use | | | | | | | | | | | | |
| B. decide where to get the information | | | | | | | | | | | | |
| A. think of all the things you know about the topic | | | | | | | | | | | | |
| B. choose the ways to collect the information | | | | | | | | | | | | |
| A. ask yourself what you need to know | | | | | | | | | | | | |
| B. find out what sources you might use | | | | | | | | | | | | |
| A. write down all the things you need to do | | | | | | | | | | | | |
| B. ask yourself what you need to know | | | | | | | | | | | | |
| A. find out what sources you might use | | | | | | | | | | | | |
| B. figure out which information is easiest to collect | | | | | | | | | | | | |
| A. think of all the things you know about the topic | | | | | | | | | | | | |
| B. ask yourself what you need to know | | | | | | | | | | | | |

	most alike					least alike			
	1	2	3	4	5	6	7	8	9
A. choose the ways to collect the information									
B. ask yourself what you need to know									
A. ask yourself what you need to know									
B. decide where to get the information									
A. write down all the things you need to do									
B. find out what sources you might use									
A. list all kinds of information you could use									
B. choose the ways to collect the information									
A. write down all the things you need to do									
B. decide where to get the information									
A. think of all the things you know about the topic									
B. find out what sources you might use									
A. list all kinds of information you could use									
B. ask yourself what you need to know									
A. think of all the things you know about the topic									
B. decide where to get the information									

- | | most alike | | | | | | least alike | | |
|---|------------|---|---|---|---|---|-------------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| A. list all kinds of information you could use | | | | | | | | | |
| B. find out what sources you might use | | | | | | | | | |
| A. choose the ways to collect the information | | | | | | | | | |
| B. find out what sources you might use | | | | | | | | | |
| A. write down all the things you need to do | | | | | | | | | |
| B. figure out which information is easiest to collect | | | | | | | | | |
| A. list all kinds of information you could use | | | | | | | | | |
| B. decide where to get the information | | | | | | | | | |
| A. choose the ways to collect the information | | | | | | | | | |
| B. decide where to get the information | | | | | | | | | |
| A. write down all the things you need to do | | | | | | | | | |
| B. decide which information is most useful | | | | | | | | | |
| A. think of all the things you know about the topic | | | | | | | | | |
| B. figure out which information is easiest to collect | | | | | | | | | |
| A. list all kinds of information you could use | | | | | | | | | |
| B. figure out which information is easiest to collect | | | | | | | | | |

- | | most alike | | | | | | | least alike |
|---|------------|---|---|---|---|---|---|-------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 9 |
| A. find out what sources you might use | | | | | | | | |
| B. decide which information is most useful | | | | | | | | |
| A. choose the ways to collect the information | | | | | | | | |
| B. figure out which information is easiest to collect | | | | | | | | |
| A. ask yourself what you need to know | | | | | | | | |
| B. decide which information is most useful | | | | | | | | |
| A. list all kinds of information you could use | | | | | | | | |
| B. decide which information is most useful | | | | | | | | |
| A. ask yourself what you need to know | | | | | | | | |
| B. figure out which information is easiest to collect | | | | | | | | |
| A. choose the ways to collect the information | | | | | | | | |
| B. decide which information is most useful | | | | | | | | |
| A. think of all the things you know about the topic | | | | | | | | |
| B. decide which information is most useful | | | | | | | | |

STUDENT EXERCISE

This is an exercise to see how you compare different things. There are no right or wrong answers. We just want to see how you would compare these things.

Here is an example of how the exercise works. Just below, you will see where I compared an apple and a banana.

		most alike										least alike
		1	2	3	4	5	6	7	8	9		
A. Apple												
B. Banana												

I thought they were both fruit so I marked them close to the "most alike" end.

Here is another example

		1	2	3	4	5	6	7	8	9
A. Black										
B. White										

Since they are opposites, I marked them at the end line under "least alike". Someone else might have marked 1 or 2, thinking that black and white are both colors. Both of us would be right since we both marked what we thought.

You try the next item. Remember, any answer that makes sense to you is okay.

		1	2	3	4	5	6	7	8	9
A. Write a report										
B. Read a book										

I am in grade _

I am a boy _
girl _

Now I would like you to compare different ways of doing a report. Suppose I assigned you a report on something you're interested in. It can be on any topic.

I have listed things you might do to help you complete the report. You might not have thought about some of these things before, but that's okay. In this exercise you will be comparing the different things you might do.

1. make a list
2. measure something
3. take notes
4. read a book
5. interview someone
6. read the newspaper
7. make a graph
8. read a chart
9. give out questionnaires
10. take a survey

In the pairs below compare each of the activities in the list. Please think carefully about your answers.

	most alike						least alike		
	1	2	3	4	5	6	7	8	9
A. make a list									
B. measure something	—	—	—	—	—	—	—	—	—
A. interview someone									
B. take a survey	—	—	—	—	—	—	—	—	—
A. read the newspaper									
B. make a graph	—	—	—	—	—	—	—	—	—
A. give out questionnaires									
B. take a survey	—	—	—	—	—	—	—	—	—
A. measure something									
B. read a book	—	—	—	—	—	—	—	—	—
A. make a list									
B. take notes	—	—	—	—	—	—	—	—	—
A. take notes									
B. read a book	—	—	—	—	—	—	—	—	—
A. read a book									
B. interview someone	—	—	—	—	—	—	—	—	—
A. interview someone									
B. read the newspaper	—	—	—	—	—	—	—	—	—

		most alike					least alike			
		1	2	3	4	5	6	7	8	9
A.	make a list									
B.	read a book									
A.	read the newspaper									
B.	read a chart									
A.	make a graph									
B.	read a chart									
A.	read a chart									
B.	give out questionnaires									
A.	measure something									
B.	read the newspaper									
A.	take notes									
B.	interview someone									
A.	read a book									
B.	read the newspaper									
A.	interview someone									
B.	make a graph									
A.	make a list									
B.	interview someone									
A.	measure something									
B.	take notes									
A.	read the newspaper									
B.	give out questionnaires									
A.	make a graph									
B.	give out questionnaires									
A.	measure something									
B.	interview someone									
A.	take notes									
B.	read the newspaper									
A.	read a book									
B.	make a graph									
A.	interview someone									
B.	read a chart									
A.	make a list									
B.	read the newspaper									
A.	take notes									
B.	take a survey									

		most alike					least alike			
		1	2	3	4	5	6	7	8	9
A.	read the newspaper									
B.	take a survey	—	—	—	—	—	—	—	—	—
A.	make a graph									
B.	take a survey	—	—	—	—	—	—	—	—	—
A.	read a chart									
B.	take survey	—	—	—	—	—	—	—	—	—
A.	measure something									
B.	make a graph	—	—	—	—	—	—	—	—	—
A.	take notes									
B.	make a graph	—	—	—	—	—	—	—	—	—
A.	read a book									
B.	read a chart	—	—	—	—	—	—	—	—	—
A.	interview someone									
B.	give out questionnaires	—	—	—	—	—	—	—	—	—
A.	make a list									
B.	make a graph	—	—	—	—	—	—	—	—	—
A.	measure something									
B.	read a chart	—	—	—	—	—	—	—	—	—
A.	take notes									
B.	read a chart	—	—	—	—	—	—	—	—	—
A.	make a list									
B.	give out questionnaires	—	—	—	—	—	—	—	—	—
A.	measure something									
B.	give out questionnaires	—	—	—	—	—	—	—	—	—
A.	make a list									
B.	read a chart	—	—	—	—	—	—	—	—	—
A.	make a list									
B.	take a survey	—	—	—	—	—	—	—	—	—
A.	measure something									
B.	take a survey	—	—	—	—	—	—	—	—	—
A.	read a book									
B.	take a survey	—	—	—	—	—	—	—	—	—
A.	take notes									
B.	give out questionnaires	—	—	—	—	—	—	—	—	—
A.	read a book									
B.	give out questionnaires	—	—	—	—	—	—	—	—	—

INTERVIEW FORM

Planning a Field Trip

1. SAY TO THE STUDENT:

"Suppose you were in charge of planning a class field trip. What are some things you would have to think about?"

ON THE ATTACHED STUDENT RESPONSE SHEET, LIST ALL THE THINGS THE CHILD SAYS JUST AS HE SAYS THEM. NUMBER EACH RESPONSE. RECORD THIS LIST UNDER "THINGS STUDENT WOULD DO" FIRST ROUND.

2. SAY TO THE STUDENT:

"How would you find out about (repeat the first item on the child's list, word for word)?"

RECORD EACH RESPONSE IN THE SECOND COLUMN ON THE STUDENT RESPONSE SHEET AND NUMBER IT IN ACCORDANCE WITH ITS LIST NUMBER. GO THROUGH THE CHILD'S ENTIRE LIST. NOTE NON-RESPONSE AS WELL AS RESPONSE. DO NOT QUESTION ADEQUACY OF ANSWER.

NOTE: IF YOU DO NOT UNDERSTAND WHAT A CHILD MEANS, SAY:

"Can you tell me more about what you mean by (repeat child's words)?"
NOTE THAT YOU HAVE ASKED THE QUESTION BY INSERTING "(?)" IN THE LIST OF THE CHILD'S RESPONSES.

3. AT THE END OF THE CHILD'S LIST OF WAYS HE/SHE WOULD GET INFORMATION ABOUT EACH OF HIS INFORMATION NEEDS, ASK:

"Now that you've been thinking about planning this field trip for a few minutes, can you think of any more things you might need information about?"

RECORD RESPONSE AND REPEAT EARLIER PROCEDURE OF ASKING HOW HE/SHE WOULD COLLECT THE INFORMATION. LIST THESE RESPONSES UNDER SECOND ROUND ON THE STUDENT RESPONSE FORM.

4. TURN STUDENT RESPONSE FORM TO PART B. PUT A CHECK (✓) IN THE MIDDLE COLUMN NEXT TO THOSE ITEMS ON THE CRITERIA LIST THAT HAVE ALREADY BEEN COVERED BY THE STUDENT. FOR THE FIRST TWO ITEMS NOT ALREADY COVERED, SAY:

"If no one thought of _____ on the day of the field trip, what might happen?"

RECORD THE RESPONSE TO THIS QUESTION UNDER (A) NEXT TO THE CORRESPONDING ITEM ON THE CRITERIA LIST.

THEN SAY TO THE STUDENT:

"How would you get information about _____?"

RECORD THIS RESPONSE UNDER (B).

INTERVIEW FORM
Planning a Field Trip

ADDITIONAL COMMENT: IF CHILD INTERPRETS YOUR QUESTION AS AN INDIVIDUAL OR FAMILY TRIP, TRY TO RE-FOCUS THE CHILD'S THINKING BY SAYING:

"Let's think about your whole class going. What things would you need to think about if the whole class goes? About how many kids are in your class?"

DON'T QUESTION THE CHILD'S NUMBER OF CHILDREN IN THE CLASS AS LONG AS IT IS CLEARLY A LARGE GROUP — 15 TO 50 IS ACCEPTABLE. THE CHILD NEED NOT BE ACCURATE, BUT SHOULD HAVE THE IDEA OF A GROUP NEEDING PLANNING AND COORDINATION, ETC.

INTERVIEW FORM

Student Response Sheet

Part A

Things Student Would Do

How Student Would Find Out About These Things

FIRST ROUND

SECOND ROUND

(TURN PAGE FOR PART B)

CRITERIA LIST	Generated by Student (✓)	(A) "If no one thought of _____ on the day of the field trip, what might happen?" (B) "How would you get information about _____?"
Place (where to go)		(A) (B)
Distance (how far away)		(A) (B)
Time (how long will field trip take?)		(A) (B)
Expenses (what it will cost each student)		(A) (B)
Food (should meals be planned?)		(A) (B)
Transportation (how would they get there?)		(A) (B)
Activities (what will we do?)		(A) (B)
Permission to go (whom do we need to ask?)		(A) (B)
Class Preference (where does the class want to go?)		(A) (B)
Chaperones (who will come with us?)		(A) (B)

Teachers' Questionnaire
"What Do I Know?"

This questionnaire is designed to assess your perceptions of the teaching opportunities afforded by the program "What Do I Know?" We are interested in which concepts presented in the program might help you to teach more effectively.

Please help us by answering the questions below.

1. In your opinion, what is the main thing this program might help you to teach?

2. Listed below are skills that may have been addressed in the program. Which one(s) do you recognize that you did use or might have used as the basis for a follow-up discussion or activity? Check (✓) all that apply.
 - ☐ using standard reference aids
 - ☐ locating reference materials in a library or media center
 - ☐ recognizing the criteria for authoritative sources
 - ☐ locating resource persons who can provide required information
 - ☐ interviewing resource persons who can provide required information
 - ☐ performing computations where money is involved
 - ☐ finding the arithmetic average
 - ☐ reading and making a bar graph
 - ☐ rounding numbers to the appropriate place based on the problem situation
 - ☐ measuring
 - ☐ using the parts of a book to preview a book or to locate information
 - ☐ describing factually what was viewed or observed
 - ☐ collecting information to answer specific questions by conducting a survey
 - ☐ none of the above

(please turn page over)

3. What other teaching points did you recognize in the program that might be helpful to you, but were not listed in #2?

4. On a five-point scale, please indicate the degree to which the following concepts were effectively addressed in the program.

	<u>very effective</u>			<u>very ineffective</u>	
	1	2	3	4	5
a. determining information needs when solving a problem					
b. determining information needs when pursuing an interest					
c. the value of planning for an information collection activity					
d. techniques for planning an information collection activity					

5. Please comment on the program with respect to its appeal, comprehensibility, teachability, etc.

Teachers' Questionnaire
"Where Do I Go?"

This questionnaire is designed to assess your perceptions of the teaching opportunities afforded by the program "Where Do I Go?" We are interested in which concepts presented in the program might help you to teach more effectively.

Please help us by answering the questions below.

1. In your opinion, what is the main thing this program might help you to teach?

2. Listed below are skills that may have been addressed in the program. Which one(s) do you recognize that you did use or might have used as the basis for a follow-up discussion or activity? Check (✓) all that apply.
 - ☐ using standard reference aids
 - ☐ locating reference materials in a library or media center
 - ☐ recognizing the criteria for authoritative sources
 - ☐ locating resource persons who can provide required information
 - ☐ interviewing resource persons who can provide required information
 - ☐ performing computations where money is involved
 - ☐ finding the arithmetic average
 - ☐ reading and making a bar graph
 - ☐ rounding numbers to the appropriate place based on the problem situation
 - ☐ measuring
 - ☐ using the parts of a book to preview a book or to locate information
 - ☐ describing factually what was viewed or observed
 - ☐ collecting information to answer specific questions by conducting a survey
 - ☐ none of the above

(please turn page over)

3. What other teaching points did you recognize in the program that might be helpful to you, but were not listed in #2?

4. On a five-point scale, please indicate the degree to which the following concepts were effectively addressed in the program.

	<u>very effective</u>			<u>very ineffective</u>	
	1	2	3	4	5
a. the value of planning for an information collection activity in terms of types of sources and locating sources					
b. the value of planning for an information collection activity in terms of selecting an appropriate source	1	2	3	4	5
c. techniques for planning an information collection activity in terms of types of sources and locating sources	1	2	3	4	5
d. techniques for planning an information collection activity in terms of selecting an appropriate source	1	2	3	4	5

5. Please comment on the program with respect to its appeal, comprehensibility, teachability, etc.

Teachers' Questionnaire
"What Should I Do?"

This questionnaire is designed to assess your perceptions of the teaching opportunities afforded by the program "What Should I Do?" We are interested in which concepts presented in the program might help you to teach more effectively.

Please help us by answering the questions below.

1. In your opinion, what is the main thing this program might help you to teach?

2. Listed below are skills that may have been addressed in the program. Which one(s) do you recognize that you did use or might have used as the basis for a follow-up discussion or activity? Check (✓) all that apply.
 - ☐ using standard reference aids
 - ☐ locating reference materials in a library or media center
 - ☐ recognizing the criteria for authoritative sources
 - ☐ locating resource persons who can provide required information
 - ☐ interviewing resource persons who can provide required information
 - ☐ performing computations where money is involved
 - ☐ finding the arithmetic average
 - ☐ reading and making a bar graph
 - ☐ rounding numbers to the appropriate place based on the problem situation
 - ☐ measuring
 - ☐ using the parts of a book to preview a book or to locate information
 - ☐ describing factually what was viewed or observed
 - ☐ collecting information to answer specific questions by conducting a survey
 - ☐ none of the above

(please turn page over)

3. What other teaching points did you recognize in the program that might be helpful to you, but were not listed in #2?

4. How effective did you perceive this program to be in teaching a variety of ways to collect information (such as interviews, questionnaires, secondary sources, etc.) Indicate your perception on the 5-point scale.

<u>very</u> <u>effective</u>			<u>very</u> <u>ineffective</u>	
1	2	3	4	5

5. Please comment on the program with respect to its appeal, comprehensibility, teachability, etc.

SKILLS ESSENTIAL TO LEARNING
November - December 1978
Collecting Information Field Test

Teacher Questionnaire - Entire Cluster

Now that you and your class have used the Cluster on "Collecting Information," we would like to find out what you think about it.

1. Taking the 3 programs as a UNIT, what are the major things the unit could help you teach?

After listing major ideas, please rate the Cluster's overall effectiveness in helping you teach each one. (If you need more space, please use the back of the sheet.)

Cluster helps teach...

	<u>very ineffective</u>			<u>very effective</u>	
a.	1	2	3	4	5
b.	1	2	3	4	5
c.	1	2	3	4	5
d.	1	2	3	4	5
e.	1	2	3	4	5

2. To what curriculum area(s) do you think the cluster to be most applicable?

() language arts

() math

() science

() social studies

() other: please specify _____

Collecting Information -- Teacher Questionnaire

3. On a five-point scale, please indicate the degree to which the following concepts were effectively addressed by the cluster as a whole.

	<u>very ineffective</u>			<u>very effective</u>	
a. awareness that planning is more useful than not planning	1	2	3	4	5
b. awareness of the consequences of not planning	1	2	3	4	5
c. the value of a systematic approach to collecting information	1	2	3	4	5
d. consideration of a wide variety of sources for information gathering	1	2	3	4	5
e. consideration of a wide variety of techniques for information gathering	1	2	3	4	5

4. If you were to use the cluster again, please describe how you might do so (in terms of content areas, specific lessons, etc.).

Please comment on the cluster with respect to its appeal, comprehensibility, teachability, etc.

APPENDIX C

**COGNITIVE STRUCTURE AND MULTIDIMENSIONAL
SCALING TECHNIQUES**

Cognitive Structure and Multidimensional Scaling Techniques

Cognitive Structure

Concern about the ways students mentally organize new information or integrate new information with knowledge they already have, leads one into the use of a theoretical concept called "cognitive structure." "Cognitive structure" refers to the internal organization of information and experience. How we learn, organize, store, retrieve, and reorganize information has been studied from several points of view (Bruner, 1960, 1964; Neisser, 1967; Ausubel, 1968). Descriptive metaphors have become common in writing about this very abstract idea; terms used include "schema," "schemata," "maps," "ideational scaffolding," and "structure." Even though the word "structure" may connote a permanence in some contexts, "cognitive structure" is thought of as responsive to both environmental events and the person's own internal or mental experiences.

According to Piaget's voluminous research, interaction of a child with a challenging environment is an over-arching stimulus to development of increasingly complex thought structures. Piaget referred to the mental organization of information as "schemata." (Piaget and Inhelder, 1956)

Neisser (1967) argued against the view that ideas, memories, or facts exist in a person's brain in a permanent form.

"What is natural, on the contrary, is adaptive variation ...Visual images are not copies (of the external object) but suitably constructed originals ...Verbatim recall of a story occurs very rarely, while reorganization in line with the interest and value of the subject must be expected. (1967, p. 282)

Much human learning is a reconstructed, transformed version of discrete experiences; the discrete experiences are often no longer available to our immediate recall. Neisser cited as examples our grasp of the surrounding

geography, our "feel" for driving a car, our understanding of history, and our intuition about linguistic form. He defined a cognitive structure as "a non-specific but organized representation of prior experiences" (1967, p. 287).

A famous poster, from a cover of The New Yorker magazine, depicts what might be a New York City resident's cognitive map of the United States. A fairly detailed New York City skyline fills the foreground; beyond the Hudson River is an empty space with a few city names written in: Chicago, Kansas City, Las Vegas, etc. A sharp line indicates the west coast; "Los Angeles" is printed on the coastline. A vast Pacific Ocean stretches to fill the remainder of the poster and three small humps, suggesting land masses, are marked "China," "Japan," and "Russia."

The salient features of our mythical New Yorker's cognitive "map" of the United States are the city, the river, the West Coast and the Pacific Ocean. Japan, China, and Russia are more prominent than cities beyond the Hudson River, known only by name and approximate location. While humorous, if stereotypic, The New Yorker poster conveys the idea that cognitive maps or structures are greatly affected by our experiences, interests, values, and needs for information.

Instruction, as part of a student's life experiences, is assumed to play a role in the formation and alteration of cognitive structures. The clustering of similar concepts and sharpening of distinctions between concepts are two ways in which the organization of information can be affected by instruction. New information must be integrated into old thought patterns.

Downs and Stea (1977) reported extensive research on geographic cognitive maps. One experiment indicated that the accuracy and detail of concepts

are two ways in which the organization of information can be affected by instruction. New information must be integrated into old thought patterns.

Downs and Stea (1977) reported extensive research on geographic cognitive maps. One experiment indicated that the accuracy and detail of children's map drawings changed across age groups, but that they also reflected the mode of transportation involved in the learning experience. Few cognitive structures can be as easily visualized as can interpretations of geographical information. Furthermore, abstract verbal structures frequently have no "real life" counterpart that confirms the "rightness" of the structure.

Ausubel (1968) asserted that new information would be learned and remembered if the student's cognitive structures provided adequate "ideational scaffolding." Anderson, et al. (1978) extended Ausubel's notions and demonstrated that the type of structures (schemata) surrounding factual information does indeed influence the amount of materials recalled. The authors suggested an implication for education: "the schemata a person already possesses are a principal determiner of what will be learned from a text..." Using the example of a geography text, they speculated as follows:

"The young reader will have partly formed schemata that will allow him or her to make sense of the passage, but will not permit the construction of mental representations of great depth or breadth. In the best case, a child might develop new high-level schemata from reading a geography text, though this is a matter about which very little is known."

One major area of concern is the description of cognitive structures as they exist in individuals or groups. Humans seem relatively limited in their ability to introspect and report such processes (Nisbett and Wilson, 1977). The researcher or evaluator must rely on behavioral responses of children and from them make inferences about the underlying cognitive structures. Analysis of the data derived from behavioral responses can proceed in many ways.

Multidimensional scaling, a family of statistical techniques helpful in dealing with such data, has been used to examine the effect of instructional experiences or materials on student cognitive structures. Johnson, Cox, and Curran (1970) identified a two dimensional structure for six mechanics concepts. They asked physics students to rate the similarity of pairs of concepts like "acceleration-momentum." Wainer and Berg (1972) asked students to rate pairs of short stories. A pattern was found with respect to the violence and/or fulfillment of main characters. The effect of instruction in statistics was examined by use of pre- and post-MDS measures (Traub and Hambleton, 1974). The configuration of concepts changed from pre- to posttesting, suggesting modification in the cognitive structure after instruction had taken place.

A method similar to Traub and Hambleton (1974) was used in the *ThinkAbout* Collecting Information cluster field test. The intent was to examine the cognitive structure for information collection concepts exhibited across groups of fifth and sixth graders. Most youngsters of that age group have been confronted with the need for information and hence have some familiarity with ideas about how to get information. Furthermore, fifth and sixth graders are aware of the social desirability of valuing academic pursuits. Past *ThinkAbout* field test results have supported these assertions both for groups exposed to *ThinkAbout* materials and for control groups who were not exposed to instructional television materials stressing problem-solving issues. Because traditional attitude scale items show high valuing of systematic thinking and problem-solving for all children, the impact of *ThinkAbout* has been difficult to assess due to already high baseline behaviors in the direction towards which *ThinkAbout* is aimed. While anecdotal data suggest changes in children from pre- to post-instruction and also suggest

differences between control and treatment groups, the attitudinal impact measures have frequently shown trends rather than significant differences. The differences, then, may be qualitative and reflect an interaction of effects rather than a single factor. Furthermore, whether attitudes change or not, an uncertainty remains about whether student thinking has, in fact, become more systematic. The concept of cognitive structure and techniques of multidimensional scaling form an approach sensitive to changes in complex instructional effects, and they provide some indication of reorganization of thought patterns.

Multidimensional Scaling

Now in standard use in psychology, education, and business research, multidimensional scaling (MDS) produces a picture or geometric representation of the way thought or information about a series of stimulus objects or concepts are grouped. The types of concepts or objects range widely and include instructional concepts, brands of coffee or cars, and slang terminology. (See Subkoviak, 1975, for educational applications.) Relationships between concepts are determined by the similarity or difference that raters attribute to each pair of concepts.

Multidimensional scaling can be contrasted with more familiar techniques in order to provide a conceptual understanding of its use. Two familiar types of questionnaires are those which assess preferences or opinions. Both result in a rank ordering. Consider the preference item in Figure C.1.

We want to provide evening television programs people like to watch. Please mark your first choice with a 1, your second choice with a 2, your third choice with a 3, and so on.

- ☐ documentaries
- ☐ talk shows
- ☐ situation comedies
- ☐ musical variety shows

Figure C.1. Rank-order preference item.

In a rank order of preference questionnaire, the notion of "greater than" or "less than" is quite obvious. If situation comedies are preferred over documentaries, the higher rank is assigned to situation comedies, the lower rank to documentaries.

The 5-point item shown below looks somewhat different from a rank order:

	strongly agree	agree	neutral/no opinion	disagree	strongly disagree
Tax-based support to public television should be increased	()	()	()	()	()

Figure C.2. Five-point agreement/disagreement scale.

The degree of agreement can be represented by a rank order from the greatest degree (strongly agree) to the least degree of agreement (strongly disagree). "Strongly disagree" suggests a negative agreement.

Consider asking five individuals to rank order by their preference the four types of television programs. Each individual produces a rank order

on the basis of his/her interpretation of the phrase "programs people like to watch." The ranks might look like this:

Table C.1
Ranking of Types of Television Programs

Type	Person				
	A	B	C	D	E
Documentary	2	4	4	4	3
Talk Show	4	3	3	1	4
Situation Comedy	1	1	2	2	1
Musical Variety	3	2	1	3	2

If the evaluation concern is to get an indication of how people as a group rate types of programs, the five rank orders can be converted into an "average" set of ranks. The average ranks are a summary of the group's preference. The medians for each type of program provide a picture different from any one individual's ratings, even though the summary ranks are like Person B's rankings.

Table C.2
Median Ratings and Summary Ranks of
Types of Television Programs

Type	Median Rating	Summary Rank
Documentary	3.80	4
Talk Show	3.25	3
Situation Comedy	1.33	1
Musical Variety	2.25	2

The summary ranks show situation comedies to be the most preferred type of program across the group. Musical variety, talk shows, and documentaries follow in that order. The evaluator assumes that the instrument communicated clearly enough that all five people interpreted the questionnaire item in a similar manner and that the underlying judgment reflected in each person's ratings is preference for television programming.

The five program types can be displayed on a continuum representing preference for types of television programs.

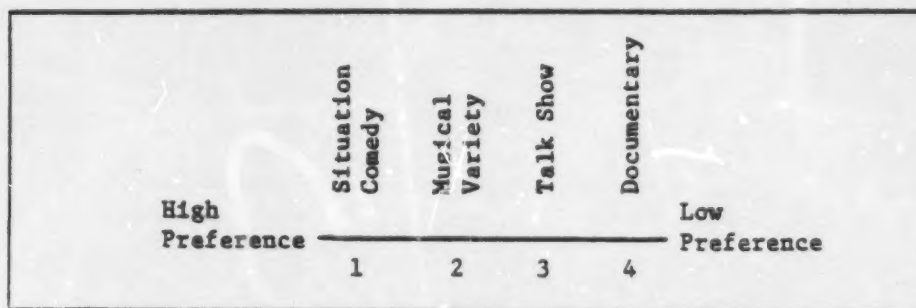


Figure C.3 Rank order of types of television programs

Obviously, one could add other types of television programs (e.g., local news, national news, detective/police drama) to a rank order and still think of the underlying dimension as "preference for types of television programs."

Sometimes, however, one is interested in several aspects of a general topic. In addition to the tax-based funding item in Figure C.2, a questionnaire might contain several statements, including items on other types of funding, program scheduling, and promotional techniques. The underlying dimension on which a person bases an agreement or disagreement can no longer be thought of as "opinion about public television funding." Perhaps

"attitudes about public television" is a better description of the dimension which underlies the judgments. Notice, however, that by making the descriptive label more general, specificity is lost.

The function of such a list of items is to rank order people on the attitude dimension. A person responds to all the items, and his/her average (median) value is said to reflect an attitude about public television. An evaluator then might want to select groups of highly positive people for further study. In Table C.3 the individual item ratings are shown for Person A.

Table C.3
Attitudes of Person A About
Public Television

Statement	Attitude				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
First		X			
Second	X				
Third				X	
Fourth		X			
Median		X			

Persons B and C could also be asked to respond to the same items and median scores could be determined for them also. (Table C.4) The relationship of these three attitudes could then be shown geographically on a single dimension. The three people can be ordered on the basis of their attitudes towards public television. Person C could be included in a highly positive

Table C.4
Median Attitudes of Persons B and C
About Public Television

Person	Attitude				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
B				X	
C		X			

group. Person A's inclusion depends on the evaluator's decision about how positive the group ratings must be. Person B would certainly be excluded.

These examples illustrate three things: (a) questionnaires can "scale" (or order) objects, concepts, and/or people; (b) the ordering or

C	A	B
Strongly Agree	Agree	Disagree
	Neutral	Strongly Disagree

Figure C.4 Rank order of attitudes about public television

scaling can be done with individual or grouped ratings; and (c) one cognitive dimension is assumed to underlie many familiar questionnaires. This type of dimension can be considered a unidimensional cognitive structure in the case of preference for types of television programs. In contrast, the example of a very general dimension including attitudes about television funding, programming and promotions forces us to consider multidimensional judgments.

The use of a one dimensional rating scale sometimes brings objections from raters. The fundamental objection is to the grouping of several types of judgments into one summary score and assuming it to lie at a given point on one dimension. The objection might sound like:

But, I don't have just one opinion about public television. I have lots of opinions, and besides... look at this item: 'Tax based support to public television should be increased.'

I might agree if I knew what would happen to the money... if programs I liked better were added, like more jazz and country music.

But if it's going to be more classical stuff, I'd strongly disagree.

Oh... about kids' programs? If the money were used for kids' programs... well, I guess I'd have no opinion about that at all!

The objection suggests an interaction of two important dimensions. One dimension (programming considerations) pulls or sways the judgment to describe the person's thinking process. Multiple dimensions may be necessary to provide sufficient scope with detail. The diagram below suggests how two dimensions might interact to describe three very different judgments.

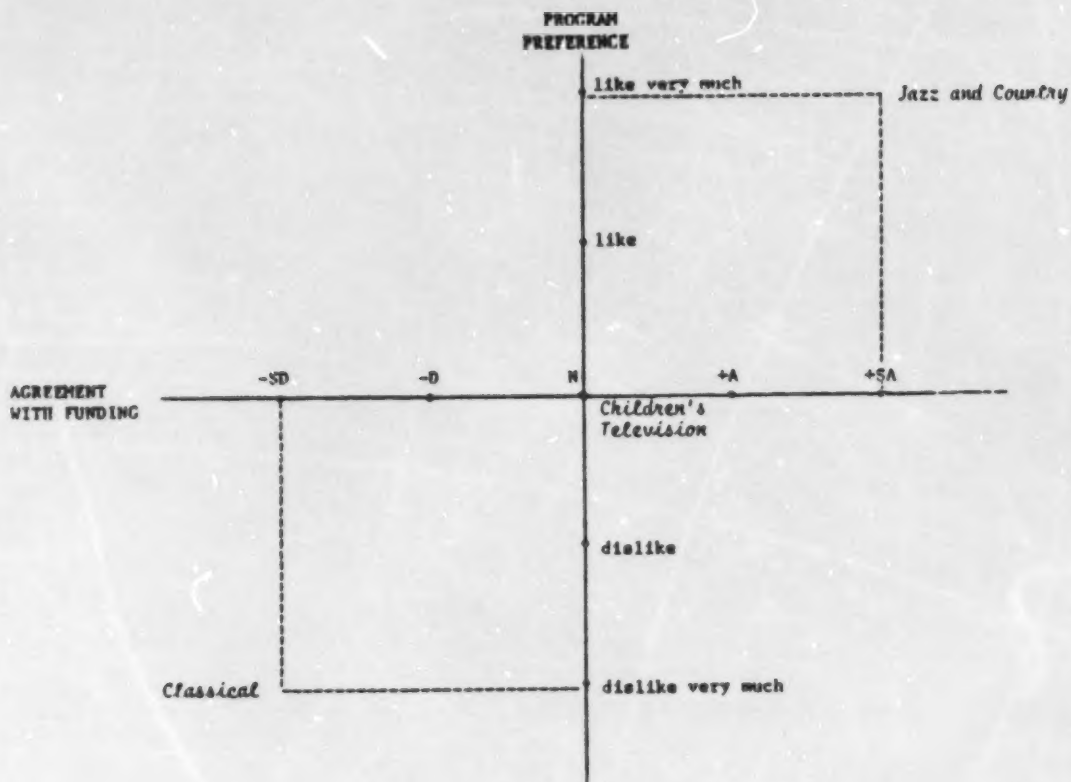


Figure C.5. Interaction of programming preferences with opinions about television funding

When a unidimensional description fails, one alternative is multi-dimensional scaling. The MDS techniques and associated questionnaires used in this report are similar to more traditional unidimensional methods of evaluation in at least the following ways:

- (a) No necessarily right or wrong answers are assumed for the items rated.
- (b) Both methods assume that thought processes are orderly, have a quality of degree, and can be translated into rank ordered data.

- (c) Consequently, both assume that judgment processes can be summarized in terms of dimensions.
- (d) Neither assumes that the richness or complexity of cognitive organization can be completely described by a mathematical model.

Important differences between the two sets of methods include:

- (a) The number of dimensions that can be considered simultaneously;
- (b) A consequent difference in capability to show configurations of information.

When assessing the cognitive structures that children impose on information presented to them during instruction, the researcher may now know the number or content of the dimensions. The purpose of the investigation is to identify the dimensions or to map the cognitive structure. Multidimensional scaling provides the mathematics to answer two fundamental questions about a given set of objects or concepts.

Question 1: How many dimensions best describe the cognitive structure?

Question 2: How do the individual concepts cluster themselves with respect to the dimensions; i.e., what configuration appears?

The mathematics of MDS quickly becomes very complicated. In order to determine a configuration or geometric display, representing a cognitive structure, several tasks must be completed. The following is not the only way to proceed but describes the steps taken in the *ThinkAbout* Collecting Information cluster field test.

First, the ratings of similarity/dissimilarity by students were grouped into a single set of average measures, one for each item (Form C: 36; Form D: 45).¹ The average measure used was the root-mean-square.

The data were analyzed using the KYST multidimensional scaling program (Kruskal, Young, and Seery, 1973). Geometric space can be varied in its number of dimensions, and the KYST program provided representations of the

¹ The number of items (I) is determined by all possible pairs of the list of concepts (N): $I = \frac{N(N-1)}{2}$.

data in up to six dimensions. The greater the number of dimensions the easier to obtain a statistically "good fit" between the actual data and the computerized geometric solution. The goal, however, is to find the best fit in the smallest number of dimensions.

When the computerized geometric solution and the data are compared for the degree of error or failure to fit together, a "stress" value is computed. Kruskal's stress value varies between 0.0 (perfect fit-no error) and 1.0 (no fit-all error). A stress value is given for each configuration produced and is one guideline for selection of the appropriate number of dimensions.

The number of dimensions which best describes the configuration is determined not only by reference to Kruskal's stress value but also by the number of concepts included in the questionnaire and the meaningfulness of the dimensions which are derived by computer program. While stress values for a 4- or 5- or 6-dimensional solution may be very low, the relatively small number of concepts rated (Form D: 10; Form C: 9) supports the choice of a 3-dimensional solution as appropriate in most of the present analyses. The choice of the number of dimensions and orientation of axes is aimed at a balance between parsimony, stability and visualization, on the one hand and overall goodness of fit to the data (Shephard, Romney, & Nerlove, Vol. I, 1972, p. 9).

For the purposes of this study, the configurations selected were analyzed for grouping of concepts and movement of concepts when two or more configurations were contrasted.

On a given computer print-out configurations may seem to have shifted dramatically in that all points on the left might have moved to the right and vice versa. In fact, however, because of the nature of the computer

program, the configurations may need to be rotated or "flipped over" in order to demonstrate congruence with a second configuration. The nature of the mathematics underlying MDS solutions allows the configuration to be rotated about the origin, or zero point, of the geometric space. Such rotation does not alter the distances between the concepts and so maintains the integrity of the configuration.

Regardless of the number of dimensions in an MDS solution, the first dimension is positioned to account for the largest portion of variance. All dimensions are rotated to principal components by the KYST program. Each succeeding dimension accounts for a smaller amount of variance than the dimension before it. Consequently, the major interpretive consideration is given to the first one or two dimensions of any solution.

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APPENDIX D
AGENDA FOR OBSERVER
TRAINING SESSIONS

AGENDA
OBSERVER TRAINING SESSIONS

Monday Session

- 9:15 - 9:30 Introduction
- 9:30 - 10:30 Orientation to Project and Cluster
- 10:30 - 10:45 Break
- 10:45 - 12:00 Overview of field test
- A. Purpose
 - B. Kinds of data to be collected
 - C. Role of classroom observer
 - D. Daily schedule
 - E. Review of instruments in packet
 - F. Questions
- 12:00 - 1:00 Working lunch (watch other cluster programs and discuss)
- 1:00 - 1:15 Training on equipment and discussion of what to do if something goes wrong
- 1:15 - 3:15 Training on observation instruments

Tuesday Session

- 11:00 - 11:15 Questions from yesterday
- 11:15 - 12:00 Training on observation instruments
- 12:00 - 1:00 Working lunch (watch warm-up programs and discuss)
- 1:00 - 2:30 Training on performance tests and other student instruments
- 2:30 - 2:45 Questions
- 2:45 - 3:00 Break
- 3:00 - 5:00 Teachers' meeting

APPENDIX E

**ANALYSIS OF VARIANCE TABLES FOR
STUDENT QUESTIONNAIRES FORMS A AND B**

Table E1

Analysis of Variance for
Number of Acceptable Sources Named
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Treatment Condition	8.335	1	8.335	4.809*
Testing Condition	.246	1	.246	.142
Treatment X Testing	.482	1	.482	.278

* $p < .1$

Table E2

Analysis of Variance for
Number of Acceptable Sources Named
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Treatment Condition	2.276	1	2.276	1.285
Grade Level	1.626	1	1.626	.918
Treatment X Grade	7.279	1	7.279	4.111**

** $p < .05$

Table E3

Analysis of Variance for
Number of Acceptable Sources Named
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Testing Condition	.006	1	.006	.003
Grade Level	.032	1	.032	.018
Testing X Grade	4.605	1	4.605	2.659

Table E4

Analysis of Variance for
Number of Techniques Named
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Treatment Condition	.093	1	.093	1.007
Testing Condition	1.099	1	1.099	11.963*
Treatment X Testing	.092	1	.092	.998

*p=.001

Table E5

Analysis of Variance for
Number of Techniques Named
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Treatment Condition	.216	1	.216	1.386
Grade Level	.305	1	.305	1.956
Treatment X Grade	.712	1	.712	4.560**

**p<.05

Table E6

Analysis of Variance for
Number of Techniques Named
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Testing Condition	1.058	1	1.058	11.869*
Grade Level	.183	1	.183	2.051
Testing X Grade	.210	1	.210	2.353

*p=.001

Table E7

Analysis of Variance for
Number of Inappropriate Responses
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Treatment Condition	.046	1	.046	.053
Testing Condition	4.474	1	4.474	5.054*
Treatment X Testing	.493	1	.493	.557

*p<.05

Table E8

Analysis of Variance for
Number of Inappropriate Responses
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Treatment Condition	.028	1	.028	.036
Grade Level	.003	1	.003	.004
Treatment X Grade	.140	1	.140	.180

Table E9

Analysis of Variance for
Number of Inappropriate Responses
(Student Questionnaire Form A, Question 1)

Source of Variation	SS	df	MS	F
Testing Condition	4.291	1	4.291	4.666*
Grade Level	.035	1	.035	.038
Testing X Grade	.037	1	.037	.040

*p<.05

Table E10
Analysis of Variance for
Composite Score
(Student Questionnaire Form A)

Source of Variation	SS	df	MS	F
Treatment Condition	14.398	1	14.398	1.817
Testing Condition	8.063	1	8.063	1.018
Treatment X Testing	5.182	1	5.182	.654

Table E11
Analysis of Variance for
Composite Score
(Student Questionnaire Form A)

Source of Variation	SS	df	MS	F
Treatment Condition	.005	1	.005	.001
Grade Level	1.922	1	1.922	.235
Treatment X Grade	53.033	1	53.033	.012*

*p=.01

Table E12
Analysis of Variance for
Composite Score
(Student Questionnaire Form A)

Source of Variation	SS	df	MS	F
Testing Condition	14.408	1	14.408	1.861
Grade Level	39.106	1	39.106	5.051**
Testing X Grade	2.494	1	2.494	.322

**p<.05

Table E13

Analysis of Variance for
Acceptable Responses
(Student Questionnaire Form B, Question 1a)

Source of Variation	SS	df	MS	F
Treatment Condition	1.009	1	1.009	2.657
Testing Condition	1.226	1	1.226	3.228*
Treatment X Testing	.976	1	.9.6	2.571

* $p < .1$

Table E14

Analysis of Variance for
Acceptable Responses
(Student Questionnaire Form B, Question 1a)

Source of Variation	SS	df	MS	F
Treatment Condition	1.618	1	1.618	4.041*
Grade Level	1.080	1	1.080	2.699
Treatment X Grade	.000	1	.000	.000

* $p < .05$

Table E15

Analysis of Variance for
Acceptable Responses
(Student Questionnaire Form B, Question 1a)

Source of Variation	SS	df	MS	F
Testing Condition	1.407	1	1.407	3.641*
Grade Level	.889	1	.889	2.299
Testing X Grade	.084	1	.084	.216

* $p < .1$

Table E16

Analysis of Variance for
Unacceptable Responses
(Student Questionnaire Form B, Question 1a)

Source of Variation	SS	df	MS	F
Treatment Condition	1.083	1	1.083	3.782*
Testing Condition	.019	1	.019	.067
Treatment X Testing	.179	1	.179	.625

* $p = .05$

Table E17

Analysis of Variance for
Unacceptable Responses
(Student Questionnaire Form B, Question 1a)

Source of Variation	SS	df	MS	F
Treatment Condition	1.559	1	1.559	5.432**
Grade Level	.506	1	.506	1.764
Treatment X Grade	.047	1	.047	.164

** $p < .05$

Table E18

Analysis of Variance for
Unacceptable Responses
(Student Questionnaire Form B, Question 1a)

Source of Variation	SS	df	MS	F
Testing Condition	.044	1	.044	.152
Grade Level	.539	1	.539	1.858
Testing X Grade	.190	1	.190	.656

Table E19

Analysis of Variance for
Acceptable Responses
(Student Questionnaire Form B, Question 1b)

Source of Variation	SS	df	MS	F
Treatment Condition	4.379	1	4.379	2.926*
Testing Condition	3.705	1	3.705	2.476
Treatment X Testing	4.621	1	4.621	3.088*

* $p < .1$

Table E20

Analysis of Variance for
Acceptable Responses
(Student Questionnaire Form B, Question 1b)

Source of Variation	SS	df	MS	F
Treatment Condition	1.881	1	1.881	1.219
Grade Level	.150	1	.150	.097
Treatment X Grade	1.327	1	1.327	.860

Table E21

Analysis of Variance for
Acceptable Responses
(Student Questionnaire Form B, Question 1b)

Source of Variation	SS	df	MS	F
Testing Condition	3.427	1	3.427	2.212
Grade Level	.016	1	.016	.010
Testing X Grade	1.118	1	1.118	.722

Table E22
Analysis of Variance for
Composite Score
(Student Questionnaire Form B)

Source of Variation	SS	df	MS	F
Treatment Condition	4.380	1	4.380	.958
Testing Condition	11.977	1	11.977	2.619
Treatment X Testing	1.534	1	1.534	.335

Table E23
Analysis of Variance for
Composite Score
(Student Questionnaire Form B)

Source of Variation	SS	df	MS	F
Treatment Condition	3.114	1	3.114	.683
Grade Level	32.750	1	32.750	7.183**
Treatment X Grade	.204	1	.204	.045

** $p < .05$

Table E24
Analysis of Variance for
Composite Score
(Student Questionnaire Form B)

Source of Variation	SS	df	MS	F
Testing Condition	14.604	1	14.604	3.378*
Grade Level	41.179	1	41.179	9.524***
Testing X Grade	2.209	1	2.209	.511

*** $p < .005$

* $p < .1$

APPENDIX F

TEACHERS' COMMENTS ON THE
COLLECTING INFORMATION CLUSTER

Teachers' Comments on the Appeal,
Comprehensibility and Teachability of

"What Do I Know?"

I. Complete Orientation Condition

A. Fifth Grade

1. (1) Students were attentive and receptive. (2) The main idea of ascertaining facts known and facts needing to be known was very easily determined. (3) B, C, D [*refers to student objectives listed on teacher questionnaire*] were obscure concepts in the program "What Do You Know?".
2. Appealing because of the lost dog situation. Repetitive technique of presenting important steps in logical problem solving helps students to comprehend and retain essential steps being developed in specific situations. Basic information on tape lends itself to teaching because there is opportunity for numerous variations of the subject matter or topic being explored.
3. I personally felt a little uncomfortable since I had not previewed the lesson.
4. The show appealed to the children as it dealt with a common problem they could relate to. The acting was believable and the story interesting. The children could understand the story and the teaching points were clear and easy to follow.
5. Very appealing subjects and characters! Finding problems at school where this method could be used was difficult for the class—to find. Practical application needs more practice with my students and class.
6. I feel this program was appealing to the children. It was to me, and the content makes it easy to teach the concept "What do I know about a situation, and what else do I need to know before I proceed." Comprehensibility seemed a little vague to the children, but it's Monday morning and their response was typical.
7. I think this is an excellent concept, which can effectively be used in the classroom.
8. Appeal was good. I didn't find many skills or much information which I would use in my teaching unless I took time to create a situation. We have so many things in the curriculum that we (and the children) really are held accountable for that there is little time available for this type of teaching.

9. The appeal of the program is excellent. What could be more interesting to children than pets and UFO's? The teachability is very good also provided the teacher involves herself and "follows through." My only criticism is that the children on the program talk too fast. I could not understand them in places.
10. The program held the attention of the children. The story situations were ones with which the children could identify, could project themselves into. This makes recall of action —"Why?", —"What do you think would have happened if—?", etc.—all the way to "Can we use what we've learned to —?" a natural follow-up discussion.

B. Sixth Grade

1. The program was highly motivating for this age group. It's appeal made children more aware of its message—thus correlation with actual classroom activities was accomplished more easily.
2. The first segment seemed to appeal to 5th graders (lost dog); it was difficult to evoke interest in follow-up.
3. Very appealing to this age group.
4. Program appeals to this age level. They can relate to the problems being considered and the methods used to bring about a solution.
5. I felt that the approach taken in the program was presented in such a way as to outline and show specifics as to what one must do to begin tackling a problem. It was a simple easy-to-follow plan that I felt could be adapted successfully to any situation.
6. Pupils were attentive with many relating to similar experiences. Procedures to follow in reporting Lost or Founds, were understandable and information. Follow-up activities were correlated with Language Arts, Science and Math.

II. Minimal Orientation Condition

A. Fifth Grade

1. (1) The subject matter made the program relatively interesting.
(2) Presentation of using the newspaper, radio, and other sources (police department, Humane Society) were meaningful.
2. I felt that the program is a very viable means of creating group discussion of segments of the process skills. There is a story to the program which tends to keep the students attention.
3. Children were attentive throughout the program. They seemed to grasp the main idea. As for follow-up lessons—well I'm not sure!
4. (1) very interesting and appealing program. (2) Good examples—(puppy and flying saucer). (3) To be continued (a good idea) (for continuing interesting).
5. Subject appeals to the kids. Kids are able to follow and understand the story well. It does teach them to look at facts and think before acting.
6. I feel the program was very appropriate for fifth graders. The problems the students encounter that the concepts, solutions, etc. could be used or transferred. It encouraged students to think for themselves.
7. The shows were appealing because some of the people were close to students' ages, the music, and the episodes were easy for some students to relate to. Most were easy for the students to comprehend. They didn't really understand—I feel—when to use the things in the show. As for teaching purposes, not having previewed the films, made follow-ups difficult.
8. The choice of the subject-in-question was a very good one, since the prospect of a lost puppy captured the children's interest immediately. I felt they empathized more easily than had the search been for a lost wrist watch or some other inanimate object. The audio was much clearer and more understandable than in the previous two ["warm-up" programs-- "Manu Waus to Go" and "Brainstorming"], and the children more nearly the age of my fifth graders. Although the class is predominantly Anglo-Saxon, they made no ethnic distinction and seemed not even to notice that the girls spoke to each other once in Spanish. The research approach also pointed up media sources other than the standard reference library one also.

9. Good program. It easily led to a good discussion afterward.
10. Highly educational mini programs, presented with beautiful scenery which is very appealing to students, as well as a magnificent approach to problem solving. A program that supports and enhances efforts in working together to accomplish a mutual understanding—goal.
11. This program had a very high student appeal. It closely related to something all were familiar with — a puppy. I felt it followed the two rules very well of solving the problem and the appropriate places to look for information.

B. Sixth Grade

1. Appropriate material for grade level. Very interesting format, content. Needs to be introduced more thoroughly.
2. Very effective, held children's interest.
3. Comprehension level of the first 2 shows ["*Many Ways to Go*" and "*Brainstorming*"] was a little difficult for my low reading group. The only thing I would emphasize from these first 2 shows would be the importance of planning ahead. From the show "What Do I Know" I think the students related better to it because the approach was more realistic.
4. I feel the program was most complete, informative, and easily understood. I feel the lesson of being honest when finding something was well illustrated, and giving correct information was stressed.
5. The children enjoyed it. It contained humor which was appealing to them. The repetition of what to do was good for teaching the concepts.
6. This program provides the observer with a variety of areas to teach. Some examples are:
 - a. process of thinking things out
 - b. uses of resources materials
 - c. newspaper study
 - d. metric use in measuring

However, I feel that students in this area have a hard time relating to those in the films.

Teachers' Comments on the Appeal,
Comprehensibility and Teachability of

"Where Do I Go?"

I. Complete Orientation Condition

A. Fifth Grade

1. Children were disappointed in the ending or logical answer to the UFO in the film. This indicated that they really wanted entertainment or fantasy rather than the scientific information. The consistent use of the techniques and strategies presented in these films would enable the students to develop a further desire for logical solutions to problems. One brief viewing of the film is not enough to really evaluate it objectively.
2. The program had high interest level. The teaching points were well presented.
3. I like the "teletype" noise to get attention before "Where Should I Go?" etc.
4. The children liked the story about the UFO. They understood more than I expected of them about UFO's and sources of information (from TV programs on subject). Possible teachability is seen as a goal.
5. Most of techniques used in the program at one time has been used in the class, however, the students do not seem to connect the two unless reminded.
6. The appeal to boys, I think, would probably be greater than girls. I believe the children understood the program real well and that it opened up new ways of approaching problem-solving situations.
7. Appeal is excellent—children could comprehend and understand with little help.
8. The teaching points were adequately presented. The children followed the action with interest, anxious to know each bit of information the boys would get. While some were disappointed that Pete and Marty had not seen a UFO, one comment overheard was, "Well, I won't know for sure they didn't until I research this hologram thing."

B. Sixth Grade

1. Teaches children what sources may be used and how to decide which would be better.

2. The program seemed effective and the students were attentive. I should have done more follow-up and plan to incorporate the program more when we do our research unit.
3. UFOs have great appeal to this age group and bring immediate interest.
4. The children enjoyed it—they are very interested in UFOs.
5. Very well done—all areas well covered. Don't like the printing by students.
6. Excellent, easily understood by students.
7. Pupils were attentive and interested. Several volunteered to do research and make reports to the class on several things mentioned, UFOlogy, laser beams, microfilm, etc. Many were anxious to share personal experiences.
8. I felt that this was an exceptionally well done lesson on locating sources. The presentation held great appeal to the students because of the subject matter. It was easy to understand, and the main ideas stood out so that the student was able to recognize points made.

II. Minimal Orientation Condition

A. Fifth Grade

1. UFOs seem to be a good motivator
2. The subject matter appeared to be very appealing to the students. I would have liked to have seen more time devoted to using materials in the library. All in all, I feel it dealt effectively with showing a correlation or the solution to the research given to it.
3. Well presented, appealed to kids—understood by kids, could be used as a teaching tool.
4. Excellent program. The only thing I didn't like about it was the ending, it seemed very abrupt. I wasn't even sure it was over and I got the feeling the children felt the same way.
5. Students could relate more to the children in the film due to more familiar situations. More interest was shown because of these familiar activities. Film showed several areas which could be expanded on, especially on using resource materials.
6. Of the four so far, this one seems second only to the segment on the lost puppy for catching the attention and interest of my 5th graders.

7. This program appealed to the children, especially the boys. Its subject was current and could be related to reading of UFOs in the newspaper and reports on TV. Today, it also brought the subject of math in finding the cost of a telephone call.
8. Very appealing, easy to understand, as well as challenging.
9. "What Do I Know?" was a good program. The students enjoyed the story because it had suspense, characters close to their age, and because the boys worked to solve the mystery themselves. The teaching material was included in the program so the students could "learn" as they enjoyed the show. The material presented was valuable because the students use the reference materials for classwork.
10. Children really enjoyed it. Provided good organizational plan for collecting information. Made discussion afterward easy.

B. Sixth Grade

1. Don't feel program answered my personal questions about hologram. Will have to problem-solve for my own information. Very interesting, easily understood, enjoyable.
2. The appeal was only there if you were interested in UFO, it did nothing to get your attention.
3. The students seemed very interested in the unusual situation the children in the film were involved in. I hope my students will be excited and that I can challenge them to "go it alone" in solving problems rather than being so dependent on help from others.
4. Very interesting and appealing to the students.
5. I still like the repetition and humor. I like the practical applications to other problems.
6. A very good film.

Teachers' Comments on the Appeal,
Comprehensibility and Teachability of

"What Should I Do?"

I. Complete Orientation Condition

A. Fifth Grade

1. Favorite menu was an appealing topic—children can easily relate to it. Specific skills touched would need much elaboration in overview of a selected topic.
2. The program was really helpful and it shows each student how to think for themselves and solve a lot of their own problems. Program was excellent.
3. It was a good show and a problem the children could relate to.
4. I think the rules presented in the program can be transferred to similar situations that the students will actually encounter.
5. I was a little disappointed in the response from the class. Personally, I felt this was a subject the class could relate to, because they often complain about the lunches. Perhaps we can try this same project for the class to see how it would work. On the posttest, I felt the students did not relate the pre and posttest with the programs.
6. I think that the children found the subject matter appealing. It was comprehensible and a good example for teaching.
7. This concept is very good. It can easily be related to other areas of study. It coincided very well with our health unit.
8. The program was one to which the children could relate. It held their interest after capturing their attention. The stated goals were very well met.

B. Sixth Grade

1. The program was very interesting and the students seemed to enjoy it and understand it.
2. The method of presentation makes it very adaptable to any teaching situation.
3. Clear.
4. Many teachers need to be reminded of the technique of affective questioning. (So as not to elicit a yes or no answer.) Some suggestions should be included in the teacher's guide.

5. I was impressed with the situation as being one that had great appeal to the students. I liked the different approaches and the fact that the problem took effort to solve. I feel the program showed how the gathering of information could be adapted to other situations.
6. "What Should I Do?" was enjoyed by all and stimulated class. They, too, wanted a menu change.
7. Pupils became interested in discussing our school lunch program and how they could have input in planning.
8. Somewhat boring (not nearly as good as others.) The points were good—but the actually tape presentation did not create much interest for students to pay attention to it.

II. Minimal Orientation Condition

A. Fifth Grade

1. All of the concepts presented in this program were easily understood and easily teachable. However, my students found the program dull.
2. Excellent program to initiate work with both bar graphs and averages.
3. Real-life situation. Humorous interview. Audio—at times it's difficult to understand what's being said.
4. Was on level of children. Children could understand ideas talked about. I believe it taught the planned ideas.
5. A-1 on all of these.
6. Very good—possibly not quite as good as the others—(could have been the bad tape, too).
7. The program did appeal to the students. They wanted to try to do something similar to the show in our school lunchroom. The students understood the action taking place and were able to discuss the methods the characters used to complete their goal or problem.
8. This program did not appeal to the children as much as the others. The audio was somewhat distorted and I think the children had some trouble understanding the words.
9. Very appealing, easy to understand, yet challenging.
10. Great!

B. Sixth Grade

1. The students seemed to enjoy this one also. I think they could relate to this situation in their own cafeteria. I think it was easy for them to understand. Carry over to their own problems, sometimes is hard.
2. School lunches are a common complaint of most children; therefore, students were attracted to this particular program. The program did an excellent job on showing the importance of planning before doing a survey. This program was good for tying in subjects such as: nutrition, math, and social studies.
3. I've enjoyed this series. Very appealing to children. Lends itself to many types of follow-up activities. Will await September for premier II.
4. The program as prepared was very comprehensive and appealing. Since the film as we viewed it was somewhat distorted because of video failure, I am not sure the children understood everything that was intended.
5. The program held the student's attention by showing a common problem of not liking the cafeteria's food. It was easy to understand in terms of vocabulary. I thought the audio portion was bad. It sounded very hollow and garbled at times.
6. Interesting program.
7. Very Good!

Teachers' Comments on the Appeal,
Comprehensibility and Teachability of the

Collecting Information Cluster

I. Complete Orientation Condition

A. Fifth Grade

1. Appeal—UFO program—most interesting. "Lunch" program-- children seemed to have a great deal of empathy with children and problem. Teacher should have a guide for each program. Main ideas should be set forth; suggested activities could be mentioned for follow-up.
2. Program was excellent! Thank you!
3. It was excellent in all areas.
4. In observation of my class--they did not relate the program with their lives, planning, studies, etc. Most of these skills they have been doing but are not aware of. I feel these programs, if not shown too often, could be very teachable. The students were distracted by the continuous observation and wondered what and why they were writing.
5. I think that the children found it very effective and attractive in appeal. I think it was comprehensible and teachable.
6. On a scale of 1-5, I would rate the cluster at least 4 in these areas. I just haven't been able to build as much enthusiasm for research in any subject area as the UFO situation. Seriously, the cluster has great appeal for the children, the action is easy to follow, and the teaching points are very well covered.
7. I do think this is a useful project. It would especially be good for the "gifted" child at this level. This program would take much preparation on the part of the teacher to make it effective.

B. Sixth Grade

1. The cluster seemed quite good; the students on the whole were very attentive for the programs and seemed to understand them.
2. Excellent--cluster may be used as a teaching tool in all areas of curriculum.
3. It is one of the better educational programs that I have seen in holding childrens' interests.
4. Excellent programs--the last one on school menu was only fair.

5. Students liked format; choice of situations has student appeal--can be likened to their experiences.
6. Easy to work with. The class enjoys it and relates to it.
7. Very appropriate for this grade level. Children related to situations very well.
8. I felt that the cluster was well done. I especially felt the situations were meaningful to the students and were easily related to their own lives. I felt all of the situations were easy to understand and apply in other areas. Overall, I felt the programs were well received by the class.
9. Pupils were interested due to real-life situations they could relate to. Nothing seemed beyond their comprehension and they responded well to follow-up activities requiring group participation and outside assignments.

II. Minimal Orientation Condition

A. Fifth Grade

1. All of the concepts presented in this cluster were easily understood and easily teachable. However, my students found the programs dull.
2. I found the shows interesting, appealing and easily adaptable to classroom use.
3. Children were attentive for the most part. However, I don't believe the major concept of locating information or techniques for information gathering was mastered.
4. Excellent series in its appeal to teachers and students alike. Easy to teach skills portrayed.
5. It appeals to 5-6th grade students favorably; they can understand the ideas well and it would be easy to teach as this with a base.
6. I believe, as a whole, it is very good. The children seemed attentive and were fairly good in the discussions following the tape. Now that I am familiar with the 3 programs, I feel I probably could do a better job of leading the discussions in the future.
7. On the whole it was very appealing. I think the children could gain a lot of information on problem solving, its techniques, and how to use the techniques in their daily lives. It was easy to understand and used subjects which students could relate to their own environment.

8. The shows were appealing because of the age similarities, the story ideas, and the character's ability to solve the problems. The students understood the purpose of the shows and could easily discuss the material presented.
9. Very challenging, easy to understand, great teaching techniques.
10. It can be used as a very effective tool to "seize the moment" to capture: follow-up a spark of interest or corroborate a pre-planned theme. However, it does call for the willingness to "go the extra mile" in planning and coordinating. It demands more than simply presenting a teacher manual prepared lesson, but the rewards can be correspondingly greater in terms of pupil enthusiasm and output.
11. Great! Children liked it and I liked it, too!

B. Sixth Grade

1. I felt that children got quite a bit from this program; were interested, involved in all aspects. I enjoyed it and felt children did too.
2. The cluster has good appeal, it is easily understood and the teachability depends on the teacher. I found that it was easy to follow-up and make points with the students for discussion. I liked it.
3. This cluster is appealing in that it presents information collecting in a setting that students can relate to. It helps them recognize that they can use skills learned in classwork to solve problems in life outside the classroom.
4. The students seemed to enjoy the program. I thought it was quite appealing and comprehensible. It offers many alternatives for the teacher.
5. Programs were loaded with information on which to expand. All subject areas were used sometime during programs. Felt students had a very high interest in some of the latter programs due to subjects that they could relate to.
6. I would say the same things as before. I think it was easy to understand and could lead into a lot of possibilities. The students were about the same age and appealed to our students. They found a lot of parts were humorous.
7. Basically all material in every area was understandable by all who saw it.

Teachers' Descriptions of How They Would
Use the Collecting Information
Cluster Again

I. Complete Orientation Condition

A. Fifth Grade

1. Provide opportunity for students to graph information; group children with a problem to solve and let them list steps they'd take to solve the problem.
2. Might use the cluster in a social studies unit. Possibility of using it with topic "From Coast to Coast." Would combine math objectives to correlate with the history and geography of this unit. Many map skills as well as specific details about our states would lend themselves to the cluster approach in problem solving.
3. I would use the suggested plans. I found them effective and comprehensive.
4. Language--use of problem-solving, research, interviews and written and oral reports could be used.
5. Have a longer time to study the material in order to present the subject matter more enthusiastically to the students. Previewing the material first so the teacher will be able to know the material and ask the proper questions.
6. It would be excellent to use in relation to science projects in the Greater Kansas City Science Fair or for our local Educational Fair.
7. Since the cluster uses what I think of as the scientific approach to learning, I would probably use the cluster as a separate or special activity and follow-up in more than one content area--social studies, science, individual reading activities.
8. To use this cluster, I would have to do much advance discussion and planning with the class and a great deal of follow-up. With an already full schedule there is little time for this type of teaching.
9. Seeing the actual programs beforehand would make a difference in lesson plans. Specific assignment could be given to research. Motivation (with much enthusiasm) would have to be high to make this a worthwhile activity. This can be done by teacher in relation to the program.

B. Sixth Grade

1. For social studies; beginning of a particular project. I would use the programs to initiate the project to illustrate how to go about solving problems or doing projects, etc.
2. I would correlate social studies and English as a unit. Have children learn how to plan and present material they have researched. Emphasize decision making techniques.
3. This would be very helpful in teaching a unit on healthy snacks vs. junk food.
4. Use in my language arts program after first introducing the area—be a reinforcement or example of application of the concepts.
5. Math—relationship of addition to subtraction; finding average. Social studies—inductive thinking, drawing conclusions on available data. English—making outline; taking notes (choosing pertinent data) planning interview questions; planning survey questions. Reading—using technique of What Do I Know? to help decode words; help in pronunciation.
6. In social studies each child would choose a separate European country to research and prepare a travel brochure—He would want to make his country seem exciting to visit by noting interesting places to visit.
7. Incorporate this cluster into a language arts unit.
8. I would use it as a basis for a research project in English, science or social studies. I feel that this cluster would make an excellent introduction to a unit on how to write a research paper.
9. Provide worksheets for pupils that would include purpose, skills, vocabulary, and related subject area(s).

II. Minimal Orientation Condition

A. Fifth Grade

1. I would use the cluster in the areas of science and social science, giving the students a problem and applying the specific shows to the problem.
2. We would brainstorm ways one accumulates information given a specific topic. I will use the third lesson to introduce making graphs—how to and usefulness of graphs.

3. This cluster lends itself to creative drama in S.S.--depicting a particular era in history. Brainstorming using different methods of collecting information and a wide variety of sources. In math have students take a survey, and collect information regarding a neighborhood problem. Then make charts and graphs.
4. As a guide to reference and information gathering for all subjects.
5. To really use this cluster to the best advantage, I believe I need to combine it with another one--one that would relate to organizing the information collected--in other words, how to record the information collected.
6. I would give the children more specific things to look for and have them take notes so our discussion would be better.
7. Language arts--using different resources to locate various types of information, planning interviews; steps to use when working on projects; locating reference materials in the library; the importance of proper planning when solving problems or reaching goals.
8. At the beginning of each school year I teach library skills--reference materials, etc. I could very effectively use the cluster as another source of teaching the skills. I believe the students would enjoy getting information this way and actually be more apt to retain it.
9. Language arts--i.e., a poetry unit: group work on a presentation to culminate study that would use techniques of brainstorming; using written and oral skills to communicate with any potential contemporary poets; library media use to research biographical data on past poetry "greats," field study for inspirations for original verse--.
10. I might spend more time relating it to different areas we are studying.

8. Sixth Grade

1. In any social science area, possibly research orientation, behavioral area.
2. I would use it for social studies--to show how important it is to think about and research reports before doing the final draft.
3. Research projects in science or social studies. After studying "Absorbing heat energy" students might study homes and other buildings in their town--compare methods of construction--looking for features such as size and color of windows, shape of roofs and color of buildings. Language skills used in interviewing, reporting.

4. I would use it along with a chapter in our language book which is entitled "Gathering and Organizing Information." If I taught science I would use it in connection with projects that we might have.
5. Discussions of how problems relate to students, use of resource materials and where to find them, and proper approaches in finding answers to problems.
6. Being able to preview the lessons would enable one to do a lot more activities. I would like to start with some problems and follow through the steps they used. I would like to follow-up with library skills especially.
7. I'd like follow-up time to see how the class could apply what was shown.

ABSTRACT

ThinkAbout, the initial series of a multi-level video project in the Skills Essential to Learning, consists of sixty 15-minute programs and related print. It is designed for 5th and 6th grades to help strengthen reasoning skills and to review and reinforce language arts, mathematics and study skills. The series is divided into thirteen clusters consisting of from three to six lessons each. Each cluster centers on a reasoning skill basic to independent learning and problem solving.

The three-program, Collecting Information cluster is the focus of this impact evaluation. With its post-viewing discussions, the cluster is an educational treatment of approximately one-and-one-half hours. This study was designed to assess three areas of likely impact: 1) the classroom processes associated with viewing the programs; 2) teacher attitudes about the programs and their designs for potential utilization; and 3) student understanding of the processes of collecting information and students' cognitive structure associated with these concepts.

This study was conducted in three sites in the United States, and it involved 60 classrooms. A variety of data collection approaches were used, including structured and unstructured observations, questionnaires, story problems, and interviews.

Data from observations indicate that classroom utilization of the cluster meets the expectation for use expressed in the project design. Teachers and students discuss appropriate topics related to the Collecting Information cluster and they engage in relevant activities. In addition the immediate post-viewing discussions last for the expected period of time. Teacher questionnaires indicate that each program communicates its particular focus and objectives and that teachers see a range of activities associated with program utilization. The presence of related print materials seems to positively affect post-viewing lesson quality. A variety of student data indicates that the programs increased student ability to list information collecting techniques, but that 5th and 6th graders already possess a knowledge of information sources. Use of the Collecting Information cluster has a focusing and organizing effect on student cognitive structure relating to specific techniques for collecting information. Students do not seem to have the ability to communicate and organize abstract concepts related to the processes of collecting information.

Due to the limited nature of the treatment (the Collecting Information cluster comprises five percent of the entire series), generalizations from this study to the impact of the *ThinkAbout* series must be made with caution.